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POLYPORACEAE OF PENNSYLVANIA

The Genus Poria

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The Pennsylvania State College
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INDEX TO SPECIES

	Page
aestivale	20
alabamae	41
AMBIGUA	21
amoema	41
ANDERSONI	54
ANEIRINA	21
arachnoidea	24
ASIATIACA	22
attenuata	45
AURANTIACA	43
AUREA	44
betulina	59
biguttata	39
calcea	31
CALLOSA	23
CANDIDISSIMA	23
CANESCENS	24
Caryae	46
chromatica	45
chrysella	49
cinerascens	46
cinerea	46
CINERESCENS	24
conferta	25
contigua	58
CORTICOLA	25
CRASSA	26
CRUSTULINA	44
DECOLORANS	27
discolor	28
Dodgei	50
elongata	28
EUPORA	45
FERREA	55
FERRUGINEO-FUSCA	56
FERRUGINOSA	56
FIMBRIATA	29
FIMBRIATELLA	29
flavicans	45
Friesiana	63
fulvida	55
GILVESCENS	46
gilvoides (Trametes)	58
hymenocystis	24
incerta	38
INCRASSATA	46
INERMIS	57
INFLATA	30
ISABELLINA	57
lacerata	21
laetifica	52
LAEVIGATA	58
laminata	63
Leeii	55
LENIS	30
lunata	30
luteo-alba	31
LUTEO-FIMBRIATA	47
magnahypha	31
marginella	56
medulla-panis	41
MOLLUSCA	31
monticola	23
mucida	43
MUTANS	47
MYCELIOSA	32
NIGRA	59
NIGRESCENS	48
notata	33
OBLIQUA	60
obliquiformis	63
ochracea	43
ODORA	33
oleagina	34
OVERHOLTSII	34
PAPYRACEA	35
PEREFFUSA	61
perextensa	32
pinea	47
PRUNICOLA	62
PULCHELLA	49
PUNCTATA	63

	Page
PURPUREA	49
radula	38-43
RETICULATA	35
RIXOSA	50
RUFA	50
salicina	21
selecta	54
SEMITINCTA	51
SERICEO-MOLLIS	36
setosus (Trametes)	58
sinuascens	37
SINUOSA	37
SPISSA	52
SUBACIDA	38
SUBICULOSA	63
SUBINCARNATA	39
submollusca	24
SUBRUFA	39
subtilis	24
Sumstinei	21
superficialis (Boletus)	58
taxicola	51
tenuis (Fomes)	58
TENUIS (PORIA)	40
tenuis (Tramètes)	58
TSUGINA	64
UNDATA	52
UNITA	40
VAILLANTII	41
vaporaria	43
VERSIPORA	42
vitellina	47
vitellinula	49
vitrea	53
vulgaris	31
XANTHA	53
xantholoma	49
xanthospora	55
ZAMERIENSIS	43

THE POLYPORACEAE OF PENNSYLVANIA*
III. The Genus Poria†

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THE GENUS *Poria* is a member of the Family *Polyporaceae* of the Basidiomycetes. In its broadest sense, as here used, it includes virtually all normally resupinate members of the family except those which are referable to the genera *Merulius* and *Solenia*. The principal character of *Merulius* lies in the fact that the basidia are continuous over the edges of the pores which generally are so reduced that they are often little more than shallow pits or imperfect reticulations. In *Poria* the tubes are well developed and the basidia are not so continuous. In other words, the mouths of the tubes are sterile in *Poria* and fertile in *Merulius*. However there are species of *Poria* with tubes so short that they would be referred to *Merulius* without observing them microscopically. Likewise there are species of *Merulius* with tubes longer than in some *Porias*, and the demonstration of fertile tube mouths is necessary before one can refer them to their proper genus with certainty. The genus *Solenia* differs in that, while a mycelial mat (subiculum) is usually present and demonstrable, the individual tubes stand isolated from each other—not joined laterally to form a definite tube layer.

In this broad sense specimens of the genus *Poria* are not distinguishable from entirely resupinate specimens of species of *Polyporaceae* that, when more favorably situated, are definitely pileate, with sessile or effused-reflexed sporophores. It must be emphasized that members of the genus *Poria* are entirely resupinate, and that the presence of a reflexed margin, however narrow, precludes referring such a specimen to that genus. Those species of other genera of *Polyporaceae (Polyporus, Fomes, Trametes,* etc.) that are most often met in entirely resupinate condition are included in the key to species but are not described. Descriptions of them must be sought in treatments of the genera to which they pertain as shown by their normal sessile sporophores.

The genus as here treated includes 69 species that have been collected in Pennsylvania or are known to occur in bordering states where conditions are essentially the same as those in this state.

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† Papers I and II of this series were published as Technical Bulletins 298 and 316 of the Pennsylvania Agricultural Experiment Station (1933 and 1935). These should be consulted for a key to the genera and for certain miscellaneous information necessary in operating the key.

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It has been necessary to describe seven species as new to science. Undoubtedly other undescribed species occur in this state, and likewise it is certainly true that a few more species, known from other regions, will eventually be collected in Pennsylvania.

This paper is preparatory to a monographic treatment of the species of the genus occurring in the United States and Canada—a work that has been in progress for a number of years. The genus has never been completely worked for any American area. The most extensive papers have been those of Baxter (Papers Michigan Acad. Sci. 1932-41) who has studied the species occurring in the region of the Great Lakes, and who has collected widely in the United States and Alaska. W. A. Murrill monographed the brown species of North America (N. American Flora **9**: 1-15. 1907). He has also described a number of old and new species (Mycologia **11**: 1919; **12**: 1920; **13**: 1921). Under my own name several papers have appeared dealing with certain groups of species.

The critical determination of most species of *Poria* is a work that must always be left in the hands of the specialist. While it may be possible to present keys and descriptions in such a way that the general student will be able to identify most of the collections he makes, yet the finer distinctions between some of the species can be learned and applied only after a wide acquaintance with the group has been obtained, and once that has been acquired the student has become to a considerable extent a specialist in the group. The same is true for any other group of resupinate Basidiomycetes. Presenting no pileus or stem characters, the available distinctions, after a few macroscopic characters have been exhausted, must be sought in those characters which are revealed only by a microscopic study of sections and dissections, using the now familiar KOH-phloxine technic.

This technic has now been given in some detail in a number of papers by the writer (See especially "Research Methods in the Taxonomy of the Hymenomycetes." Proc. International Congress Pl. Sci. **2**: 1688-1712. 1929). Of recent years certain modifications have been introduced by myself and others, of which only two need be mentioned here. The use of phloxine rather than the earlier used eosin gives somewhat better differentiation in staining, and considerable success has been obtained in the use of one of the newer plastic mounting fluids sold under the name of "Clearcol" for giving to temporary mounts a more permanent status.

The presence or absence of clamp connections on the subiculum hyphae has been used in the key as a primary differentiating character. While admittedly unsatisfactory in a certain number of

species, it is felt that the ease and clearness with which this information is obtained in so large a number of cases outweighs the fact that in a number of species the appearance of the tissue in crushed mounts makes very difficult a determination of this point. Nor is it to be supposed that in cases where clamps are said to be absent it cannot be shown that actually they are present even though in very much reduced numbers. Since it is the presence or absence of clamps on the subiculum (not tramal) hyphae that is always the character used, it may be helpful to set down here the best method of obtaining this information in species where the subiculum tissue is very thin. The method is to cut, by the pith-razor method, *vertical* sections of the sporophore tissue to the substratum, and then crush out the sections with careful inspection as to how rapidly the crushing proceeds. Crushing is done with the eraser end of a pencil and the slide examined after each application of pressure until the hyphae of the subiculum area are sufficiently dispersed. Too much crushing is likely to result in a mingling of subiculum and tramal hyphae. In my previous work, cross sections of the tubes were almost always used for spore and other characters, while now vertical sections only are made. Spore and other hymenial characters can first be obtained and the sections then crushed out to show subiculum tissue. Where the subiculum tissue is more evident it is usually an easy matter to pick out small fragments of the subiculum with needle or scalpel after wetting with alcohol and water. It is warned that characters of the subiculum hyphae and tramal hyphae are not always the same, and that descriptions and keys are based on subiculum and not tramal hyphae. In those cases where the subiculum seems to be composed of hyphae of two types it is the predominating type to which reference is made. Some of the tougher species of *Poria,* for example, have a skeleton of thick walled hyphae, with neither clamps nor septa, and another set of staining hyphae with thinner walls and sometimes with clamps at the septa. In such cases it is intended that the species should run in the key under the caption of no clamps, especially if only a few clamps are found and these only after long search. Probably most of the cases capable of being interpreted either way have been duplicated in the two arms of the key.

Only a few terms are used that are likely to be confusing to one who has an elementary knowledge of the structure of sporophores in this group. In view of the fact that Baxter has used the term "hyphal peg" in a sense not intended by the originator of that term, and since the term has been used in this manual in a few cases, a word of explanation may be desirable. A hyphal peg, in the sense of E. A. Burt, the originator of the term, and in the

sense in which the writer introduced it, is a conical projection of closely united hyphal tips into the lumen of the tube. Baxter's use of the term (Papers Mich. Acad. Sci. **23**: 292, 293. 1938) to indicate unicellular, sterile organs of the category of cystidia is confusing. The term is used in this paper in its original sense. The term "subiculum" is used to indicate the underlying membrane on which the tubes are situated. In this sense a subiculum must necessarily be present in all specimens referable to this genus. The term "trama" is used to designate the tissue making up the walls of the tubes, and hence the hyphae usually run in a direction that is at right angles to that of the subiculum tissue. The term "setal hypha" is used to designate certain thick-walled hyphae, larger and darker than the usual subiculum and tramal hyphae, whose apices are modified into conspicuous, pointed setae that may be buried in the subiculum or trama, or may project as setae into the lumina of the tubes.

Economically the species of this genus are of considerable importance. Nearly all act as scavengers, decaying the slash of the forest floor and returning elements and compounds to the soil to be used again in the growth of the forest. *Poria incrassata* is the most important species in the decay of structural timbers in buildings, especially in the South and the far West. *P. subacida* is an important heartrot fungus in living conifers, especially in *Abies balsamea*. A number of other species are involved in the decay of structural timbers of one sort or another, entailing the loss of thousands of dollars annually in the purchase and installation of new timbers.

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Arrangement of Species

SECTION I. LEUCOPORIA

Pore surface, subiculum layer, and tramal tissue light-colored when fresh (varying from white to gray, isabelline, avellaneous, pale cream-color, pale cinnamon, etc.), sometimes changing color when wounded, often becoming yellowish on drying but sometimes changing to smoky, blackish, etc.; neither definitely bright colored nor brown; spores always hyaline under the microscope; setae never present.

A. Prominent cystidia present in the hymenium[1]

P. fimbriatella
P. decolorans

AA. Cystidia none or scarcely more prominent than the basidia

B. Pore surface white or whitish when fresh, on drying only becoming yellowish if changing at all

a. On wood of coniferous trees

b. Pores 5 to 7 per mm

P. lenis
P. odora
P. oleagina
P. subincarnata

bb. Pores between 2 and 4 per mm

c. Spores ellipsoid, oblong-ellipsoid or subglobose

P. candidissima
P. crassa
P. mollusca
P. myceliosa
P. subacida
P. Vaillantii

cc. Spores allantoid or cylindric

d. Main subiculum hyphae clamped

P. asiatica
P. sericeo-mollis

dd. Main subiculum hyphae not clamped

P. aurantiaca
P. callosa
P. papyracea
P. sinuascens
P. sinuosa

[1] *P. corticola* and *P. asiatica* are white species which have smaller and less conspicuous cystidia that could be thought of as belonging here but are described as lacking prominent cystidia; a few other species have inconspicuous cystidioles and are not placed in this group. *P. aurea* is a bright-colored species that has prominent cystidia, and *P. eupora* of that group has conspicuous cystidia, but usually has enough red or vinaceous in its coloration to place it there. In addition, resupinate specimens of *Polyporus Tulipiferae* may run to this part of the key, while resupinate specimens of *P. abietinus* have smaller and less conspicuous cystidia.

aa. On hardwoods

b. Pores more than 4 per mm

P. elongata
P. fimbriata
P. inflata
P. subincarnata
P. tenuis
P. unita
P. zamerensis

bb. Pores not more than 4 per mm

c. Main subiculum hyphae clamped

P. aneirina
P. candidissima
P. mollusca
P. notata
P. Overholtsii
P. sericeo-mollis
P. versipora

cc. Main subiculum hyphae not clamped

P. aestivale
P. ambigua
P. corticola
P. reticulata
P. subacida

BB. Pore surface white or whitish when fresh, on drying becoming darker (isabelline, avellaneous, smoky, etc., not yellowish)

a. On hardwoods

P. canescens
P. discolor
P. magnahypha
P. subrufa

aa. On conifers

P. cinerscens
P. conferta
P. subrufa

BBB. Pore surface white or whitish when fresh, on drying or wounding becoming rufescent

P. aurantiaca

SECTION II. CHROMOPORIA

Pore surface and general coloration in fresh specimens brighter than in Section I, from pale yellow to fawn, deep yellow, flesh-color, tan, red, orange, etc.; sometimes drying unchanged, sometimes deeper rufescent or darker; tissue sometimes permanently darker or blackish with KOH solution; setae none.

A. Pore surface some shade of yellow rather than red when fresh and not reddening in drying

B. With definite and conspicuous cystidia

P. aurea

BB. Without cystidia or these not conspicuous and not larger than the basidia

a. On wood of coniferous trees

P. crustulina
P. incrassata
P. luteo-fimbriata
P. xantha

aa. On hardwoods

P. pulchella
P. xantha

AA. Pore surface some shade of pink, lilac, red, salmon, flesh-color, orange, purple, etc., often darker red on drying

C. Cystidia conspicuous, incrusted

P. eupora
P. rixosa

CC. Cystidia none or not conspicuous

a. On hardwoods

P. gilvescens
P. mutans
P. nigrescens
P. purpurea
P. semitincta
P. spissa
P. subrufa
P. undata

aa. On conifers

P. nigrescens
P. rufa
P. spissa
P. subrufa

SECTION III. FUSCOPORIA

Pore surface and general coloration occasionally yellow *(P. Andersoni)* but usually yellowish brown to dark brown or blackish when fresh, not changing much on drying, always becoming permanently blackish with KOH solution; setae often present

A. Setae present in cross sections of the tubes

B. On wood of coniferous trees

P. ferrugineo-fusca
P. isabellina

BB. On hardwoods

P. Andersoni
P. ferrea
P. ferruginosa

P. isabellina
P. laevigata
P. obliqua
P. pereffusa
P. prunicola

AA. Setae absent from cross sections of the tubes

P. inermis
P. nigra
P. punctata
P. subiculosa
P. Tsugina

Key to the Species of Poria in Pennsylvania

Pore surface and general coloration of fresh sporophores white, whitish, pale cream-color, pale cinnamon, isabelline, gray, or smoky black, the subiculum always pallid; drying unchanged or only becoming yellowish, rufescent, or somewhat darker; tissue never changing permanently to blackish where touched with KOH solution; setae none; cystidia sometimes present[2]..*SECTION I. LEUCOPORIA* p. 8

Pore surface and general coloration brighter than above in fresh sporophores, from pale yellow to fawn, flesh-color, tan, red, orange, purple, etc.; drying unchanged or becoming rufescent or darker; tissue sometimes permanently darker or blackish with KOH solutions; setae none; cystidia sometimes present[2]

SECTION II. CHROMOPORIA p. 14

Pore surface and general coloration of fresh plants yellowish brown to dark brown or blackish, the subiculum always colored, always becoming permanently blackish with KOH solution and not changing on drying; setae often present[2]....*SECTION III. FUSCOPORIA* p. 16

SECTION I. LEUCOPORIA

1. Cystidia present and conspicuous, often incrusted, either with an apical cap of crystals or uniformly and heavily incrusted, the incrustation sometimes dissolving in KOH but not in lactic acid.... 2

   Cystidia none or not conspicuous and not larger in size than the adjacent basidia[3]..... 8

2. Main hyphae of subiculum septated and with clamp connections.. 3

[2] The intention here is to set up the usual three groups of the genus *Poria*, (1) the white group, (2) the bright-colored group, and (3) the brown group. Intermediates in coloration are to be referred to that group to which they seem most closely related, while all species in which the pore surface is white when fresh are to be referred to the white group even though they become darker where wounded and on drying. Thus a specimen no more than cream-colored when fresh would be referred to the first group; a cream-colored specimen with enough red in it to throw it to the buff side would be classed in the second group. Likewise all of the indefinite grays would go to the first group; tans would go either to the second or the third group, depending on the amount of red or yellow present. To the brown group would be referred browns that will become permanently darker when treated with a drop of KOH solution. Dried specimen are even more difficult than fresh ones to differentiate properly. Many white or cream-colored specimens become decidely more yellowed on drying, even showing a degree of coloration that would bar them from the first group if they showed the same depth of coloration in fresh condition.

[3] Structures known as cystidioles, not larger than the basidia and not otherwise conspicuous, are allowed in this group. Care must also be taken that large crystals along the hymenium are not interpreted as cystidia or cystidioles.

Main hyphae of subiculum showing septa but no clamps..... 4
Main hyphae of subiculum with neither septa nor clamps..... 6

3. Cystidia prominent and well differentiated, conic, not much incrusted, 12-20 μ diameter; spores 5.5–7.5x2.5–3.5 μ .....40. *P. aurea*
Cystidia fusoid, not much incrusted, 5-8 μ diameter; spores 3-4x 1.5-2 μ ..... 4. *P. asiatica*

4. Cystidia short, capitate-incrusted; septa rather abundant in the hyphae 5
Cystidia elongated, cylindric, heavily incrusted; septa infrequent or only occasional in the subiculum hyphae
Resupinate *Polyporus Tulipiferae*

5. Pore surface discolored brownish or avellaneous on drying; spores globose, 5–6 μ .....12. *P. decolorans*
Pore surface not so discoloring; spores more ellipsoid, 4.5–5.5x3–3.5 μ .....10. *P. corticola*

6. Spores cylindric or allantoid; on conifers
Resupinate *Polyporus abietinus*
Spores ellipsoid; on hardwoods..... 7

7. Cystidia 10-15 μ diameter .....16. *P. fimbriatella*
Cystidia 7.5–10 μ diameter .....42. *P. eupora*

8. Main hyphae of subiculum septated and with clamp connections.. 9
Main hyphae of subiculum showing septa but no clamps..... 42
Main hyphae of subiculum with neither septa nor clamps..... 46

9. Pore surface becoming decidedly darker (smoky or rufescent) on drying and often on wounding[4]..... 10
Pore surface not so markedly changing color from the fresh to the dried condition 13

10. Spores 7.5–11x4–7 μ, fuscous under the microscope....44. *P. incrassata*
Spores smaller, always hyaline 11

11. Pores averaging not more than 3 or 4 per mm.....33. *P. subrufa*
Pores averaging 5 to 7 per mm; scarcely visible to the unaided eye.. 12

12. Spores minute, 3–4x1 μ, allantoid.....38. *P. zameriensis*
Spores 3.5–5x2–3 μ, more ellipsoid.....Resupinate *Polyporus adustus*

13. Sporophores with one of the following sets of characters:
a. Spores 7.5–11x4–7 μ, colored under the microscope
44. *P. incrassata*
b. With globose, echinulate spores 2.5–4 μ diameter; hyphae with an occasional bulb-like enlargement at some of the septa
6. *P. candidissima*
c. With pores averaging 1 to 2 per mm..... 15
d. With pore surface dark in color, i. e. smoky to smoky-black; on hardwoods only 18
e. With context and tramal hyphae dendritically branched
Resupinate *Polyporus anceps*
f. Taste disagreeable, bitter, of rancid lard, etc.; odor none..... 14

[4] If the colors of the fresh specimens are not known, refer here any specimen that is of dark or sordid coloration in the dried condition.

Sporophores with none of the above sets of characters 20

14. Spores allantoid or cylindric; basidia 3–4 μ diameter; pore surface pale yellow ..... 55. *P. xantha*

Spores ellipsoid; basidia 5–7 μ diameter; pore surface white ..... 11. *P. crassa*

15. Clamp connections abundant, conspicuous, and on nearly all of the hyphae; producing a white, watery decay of the wood 16

Clamp connections only occasional, not so conspicuous, many hyphae without them; producing a brown, carbonizing decay of the wood 17

16. Tubes 2–4 mm long; spores cylindric ..... Resupinate *Polyporus biformis*

Tubes 4–10 mm long; spores subglobose ..... Resupinate *Polyporus delectans*

17. Pore surface pale wood-color ..... Resupinate *Trametes malicola*

Pore surface white or nearly so 18

18. Spores 3–6x1–1.5 μ ..... Resupinate *Polyporus undosus*

Spores 7–9x2.5–3 μ ..... 5. *P. callosa*

Spores 9–11x3.5–4.5 μ ..... Resupinate *Trametes sepium*

19. Mouths of the tubes 3 to 4 per mm ..... Resupinate *Polyporus fumosus*

Mouths of the tubes 5 to 7 per mm ..... Resupinate *Polyporus adustus*

20. Growing on the wood of deciduous trees 21

Growing on the wood of coniferous trees 31

Growing in greenhouses on the soil, on flower pots, etc. ..... 36. *P. Vaillantii*

21. Spores allantoid, not more than 1.5 μ thick 22

Spores cylindric, ellipsoid, globose, etc., not allantoid 26

22. Pores 2 to 4 per mm 23

Pores between 4 and 8 per mm 24

23. Subiculum hyphae 4-7 μ diameter; hyphal pegs present in the pores; taste mild ..... Resupinate *Polyporus caesius*

Subiculum hyphae 3-4 μ diameter; hyphal pegs none; taste bitter ..... 22. *P. notata*

24. Tubes 2-4 mm long, separated from the subiculum in dried specimens by a narrow dark line ..... 38. *P. zameriensis*

Tubes 1-2 mm long, not so separated from the subiculum 25

25. Subiculum papery-thin, scarcely discernible; spores 3-5x1 μ ..... 18. *P. lenis*

Subiculum definite and easily seen though less than 1 mm thick; spores 3-3.5x0.5-0.75 μ ..... Resupinate *Polyporus semipileatus*

26. Spores oblong or short cylindric, 3-5x1-2 μ ..... 28. *P. sericeo-mollis*

Spores long-cylindric, 6-8x2-2.5 μ ..... Resupinate *Polyporus biformis*

Spores ellipsoid or oblong-ellipsoid, 3.5-6x2.5-3.5 μ 28

Spores subglobose or ellipsoid, 3-4x2-2.5 μ 27

27. Hyphae incrusted, at least along the substratum; margins of sporophore not rhizomorphic ..... 20. *P. mollusca*

Hyphae not incrusted; margins of sporophore rhizomorphic ..... 21. *P. myceliosa*

28. Margins of sporophore rhizomorphic and easily separating ..... 25. *P. Overholtsii*
Margins of sporophore not rhizomorphic 29
29. Growing only on *Populus;* clamp connections well formed and distinct ..... 3. *P. aneirina*
On other substrata; clamps very small and inconspicuous 30
30. Tubes about 1 mm long ..... 37. *P. versipora*
Tubes 4-10 mm long ..... 14. *P. elongata*
31. Sporophore with well-developed mycelial cords or strands at the margin 32
Sporophore without mycelial strands or cords 33
32. Spores ellipsoid, 2.5-4x2 μ; clamp connections abundant on the hyphae ..... 21. *P. myceliosa*
Spores ellipsoid or oblong-ellipsoid, 4-7x3-4 μ; clamp connections only occasional and some hyphae lacking them ..... 36. *P. Vaillantii*
33. Spores globose or subglobose, 4-5.5 μ diameter ..... 54. *P. undata*
Spores ellipsoid or oblong-ellipsoid, 4x2.5-3.5 μ 34
Spores cylindric or allantoid 35
34. Pores 5 to 7 per mm ..... 11. *P. crassa*
Pores 2 to 4 per mm ..... 20. *P. mollusca*
35. Pore surface pure white or yellowish in dried specimens 36
Pore surface sordid, avellaneous, isabelline, cinereous, or slightly brownish in dried specimens 41
36. Cystidia abundant, 6-10 μ diameter ..... 4. *P. asiatica*
Cystidia absent or present as pointed organs or minute flask-shaped organs, only 3-4 μ diameter 37
37. Spores of the narrow allantoid type, about 1-1.5 μ diameter 39
Spores short-cylindric or allantoid but of the broader type, 2-2.5 μ diameter 38
38. Spores 5-6x1.5-2.5 μ ..... 8. *P. cinerescens*
Spores 4-5x2 μ ..... 28. *P. sericeo-mollis*
39. Taste bitter ..... 55. *P. xantha*
Taste not bitter 40
40. Subiculum hyphae 2-4 μ diameter; pores 4 to 7 per mm ..... 18. *P. lenis*
Subiculum hyphae 4-8 μ diameter; pores 2 to 4 per mm
Resupinate *Polyporus caesius*
41. Spores 4-6x1.5-2 μ ..... 8. *P. cinerescens*
Spores 3-4x1 μ ..... 32. *P. subincarnata*
42. On coniferous wood and of wide distribution in the northeastern states; spores oblong or short-cylindric, 3-4x1-2 μ ..... 52. *P. semitincta*
On coniferous wood; spores cylindric, 6-8x3-4 μ ..... 27. *P. reticulata*
On hardwoods or rarely on conifers; spores globose, 3-5 μ diameter; hyphae thick-walled, up to 7.5 μ diameter ..... 47. *P. nigrescens*
On hardwoods; spores ellipsoid to cylindric 43
43. Inconspicuous, capitate-incrusted cystidia present in the hymenium ..... 10. *P. corticola*

Cystidia none 44

44. Spores ellipsoid or oblong-ellipsoid, 4-5x2.5-3.5 μ; pores large, 1 to 3 per mm, soft, white ..... 2. *P. ambigua*

Spores ellipsoid or oblong-ellipsoid, 4-5x2.5-3.5 μ; pores smaller, 4 to 6 per mm ..... 17. *P. inflata*

Spores allantoid, oblong, or short-cylindric, 3-5x1-2 μ 52. *P. semitincta*

Spores cylindric, 5-9x3-3.5 μ; pores large 45

45. Subiculum hyphae in part 10-20 μ diameter ..... 19. *P. magnahypha*

Subiculum hyphae not more than 6 μ diameter ..... 27. *P. reticulata*

46. On wood of coniferous trees 47

On wood of deciduous trees 62

47. Spores globose or ellipsoid 48

Spores cylindric or allantoid 54

48. Hyphae of subiculum 1-2 μ diameter; margin strongly fimbriate 15. *P. fimbriata*

Hyphae larger; margin not fimbriate 49

49. Pores 5 to 7 per mm ..... 11. *P. crassa*

Pores larger 50

50. Sporophore soft and flexible in dried specimens, rather tender when fresh ..... 20. *P. mollusca*

Sporophore more rigid or somewhat cartilaginous when dry, tough or leathery when fresh 51

51. Spores globose 52

Spores ellipsoid, definitely longer than broad 53

52. Pore surface slightly flesh-color when fresh, drying darker 54. *P. undata*

Pore surface white, sometimes yellowed on drying Resupinate *Fomes annosus*

53. Subiculum hyphae 2-3 μ diameter ..... 9. *P. conferta*

Subiculum hyphae 3-6 μ diameter ..... 31. *P. subacida*

54. Sporophores with one of the following sets of characters:

a. Growing only on white cedar *(Thuja);* pores 2 per mm; spores echinulate ..... 26. *P. papyracea*

b. With the subiculum and tramal hyphae dendritically branched, the branches attenuated ..... Resupinate *Polyporus anceps*

c. Pores averaging 1 to 2 per mm 55

d. With capitate-incrusted, small, peg-like or lanceolate paraphyses in the sporulating hymenium Resupinate *Polyporus abietinus*

Sporophores with none of the above sets of characters 56

55. Tubes 3 mm or less long ..... Resupinate *Trametes variiformis*

Tubes more than 3 mm long ..... Resupinate *Trametes heteromorpha*

56. Spores cylindric, 5-9x2-3 μ ..... 5. *P. callosa*

Spores allantoid or short-cylindric, 3-6x1-2 μ 57

57. Taste bitter; tissue exuding oily material when transferred to water from alcohol ..... 24. *P. oleagina*

Taste not bitter; no such exudation 58

58. Subiculum hyphae 2-4 μ diameter 59
Subiculum hyphae between 4 μ and 7 μ diameter .....23. *P. odora*
59. Spores strongly curved, lunate or hook-shaped .....18. *P. lenis*
Spores only slightly curved 60
60. Pores 5 to 7 per mm; hyphal pegs in the hymenium
32. *P. subincarnata*
Pores 1 to 4 per mm; no hyphal pegs 61
61. Pores 1 to 2 per mm, very irregular and gaping .....30. *P. sinuosa*
Pores 3 to 4 per mm, regular .....29. *P. sinuascens*
62. Spores ellipsoid to globose 64
Spores oblong or cylindric, not curved 72
Spores allantoid, curved 63
63. Spores 2-2.5 μ diameter .....43. *P. gilvescens*
Spores 1-1.5 μ diameter .....32. *P. subincarnata*
64. Sporophore with one of the following sets of characters:
a. Pore surface daedaloid .....Resupinate *Daedalea unicolor*
b. Pore surface flesh-colored or pale cinnamon when fresh; perennial, the annual layers easily separating from each other
47. *P. nigrescens*
Sporophore with none of the above sets of characters 65
65. Hyphae 1.5-2.5 μ diameter 66
Hyphae not all as above 67
66. Sporophore easily separable, the margin strongly fimbriate; spores not truncated .....15. *P. fimbriata*
Sporophore adnate, the margin not fimbriate; spores slightly truncated .....35. *P. unita*
67. Subiculum hyphae at least in part between 5 μ and 8 μ diameter 71
Subiculum hyphae 2-5 μ diameter, none larger 68
68. Pores 3 to 5 per mm 69
Pores 1 to 2 per mm .....1. *P. aestivale*
69. Pore surface strongly discolored (sordid) on drying .....13. *P. discolor*
Pore surface yellowed or whitish on drying 70
70. Subiculum hyhae much collapsed, thin-walled .....14. *P. elongata*
Subiculum hyphae tenacious, not collapsed, the walls partially thickened .....*P. tenuis* and pale forms of 48. *P. pulchella*
71. Pores thick-walled, 4 to 5 per mm; spores globose, rather thick-walled; pore surface usually with a slightly fleshy tint when fresh
54. *P. undata*
Pores thin-walled, 3 to 4 per mm; spores somewhat longer than broad, thin-walled; pore surface whitish to yellowish .31. *P. subacida*
72. Subiculum hyphae between 2 and 7 μ diameter 73
Subiculum hyphae 1-2 μ diameter .....15 *P. fimbriata*
Subiculum hyphae in part up to 12-20 μ diameter .19. *P. magnahypha*
73. Spores 7-10x2.5-3 (-4) μ 75
Spores 3.5-7x2-2.5 μ 74
Spores 3-3.5x1.5-2 μ .....1. *P. aestivale*

74. Subiculum hyphae 5-8 μ diameter..... Resupinate *Polyporus hirsutus*
Subiculum hyphae up to 4 μ diameter..... 76

75. Usually on *Populus* or *Salix;* subiculum hyphae up to 7 μ diameter
Resupinate *Trametes Trogii*

On other substrata, especially *Carya* and *Acer;* subiculum hyphae 5 μ diameter or less.....Resupinate *Trametes malicola*

76. Pores averaging 2 to 3 per mm; spores short-oblong, 4-5x2-3 μ
7. *P. canescens*

Pores averaging 4 to 5 per mm; spores more cylindric and slightly curved, 5-7x2-2.5 μ.....43. *P. gilvescens*

SECTION II. CHROMOPORIA

1. Pore surface some shade of deep cream-color to yellow rather than red when fresh, and showing no distinctly red or buff color on drying 2

Pore surface pinkish, lilac, flesh-color, buff, salmon, orange, or red when fresh; never definitely yellow, usually darkening when wounded and on drying..... 12

2. With definite and conspicuous ventricose-conic cystidia in the hymenium, these 30-50x12-20 μ.....40. *P. aurea*

With cylindric or clavate, heavily incrusted cystidia in the hymenium, these 10-15 μ diameter.....16. *P. fimbriatella*

Cystidia none or not conspicuous and not larger than the basidia.. 3

3. On wood of coniferous trees 4

On hardwoods 7

4. Pores 1 to 2 per mm.....45. *P. luteo-fimbriata*

Pores 3 or more per mm..... 5

5. Spores ovoid or ellipsoid, colored, 8-12x4-7 μ .....44. *P. incrassata*

Spores oblong, cylindric, or allantoid, hyaline..... 6

Spores ellipsoid or globose, hyaline.....21. *P. myceliosa*

6. Taste intensely bitter; spores 3-4x1 μ; pore surface drying pale lemon-yellow or pale sulphur-yellow.....55. *P. xantha*

Taste mild; spores 5-7x2.5-3.5 μ; surface drying reddish yellor or pale bay .....41. *P. crustulina*

7. Taste intensely bitter; sporophore more or less chalky when fresh
55. *P. xantha*

Taste not bitter; sporophore not chalky..... 8

8. Spores definitely colored, subglobose, 5-8 μ diameter 56. *P. Andersoni*

Spores hyaline 9

9. Tissue permanently black with KOH solution; pore surface red in age and on drying.....46. *P. mutans*

Tissue not permanently black in KOH; pore surface unchanged on drying 10

10. Margin of sporophore rhizomorphic, easily separable. 21. *P. myceliosa*

Margin of sporophore not rhizomorphic; not separable..... 11

11. Subiculum hyphae with thickened walls, neither septated nor clamped; spores 5-7x3-5 μ.....48. *P. pulchella*

Subiculum hyphae not with thickened walls, septated and clamped; spores 3.5-6x2.5-3.5 μ ..... 3. *P. aneirina*

12. Cystidia abundant, conspicuous, incrusted; pore surface pinkish cinnamon to pinkish ochre 21
Cystidia none or not conspicuous and not heavily incrusted 13

13. On hardwoods 18
On conifers 14

14. Pores 1 to 2 per mm ..... 45. *P. luteo-fimbriata*
Pores 3 or more per mm 15

15. Spores ellipsoid or globose, hyaline 25
Spores oblong, cylindric, or allantoid, hyaline 16

16. Pore surface drying sordid, dark red, or reddish black; spores 5-7x2-3 μ ..... 39. *P. aurantiaca*
Pore surface drying pale pinkish rufescent or somewhat reddish.. 17
Pore surface drying dark red, reddish purple, or blackish purple.. 22

17. Spores 3-4x0.75-1 μ; texture thin and membranaceous
Resupinate *Polyporus amorphus*
Spores 5-7x1.5-2 μ; texture corky or sub-woody
Resupinate *Fomes subroseus*
Spores 3-4x1-1.5 μ; texture coriaceous ..... 50. *P. rixosa*
Spores 4-5x2.5-3.5 μ; texture waxy or coriaceous ..... 33. *P. subrufa*

18. Spores allantoid, not exceeding 1.5 μ diameter; hyphae septated but not clamped; pore surface dark red on drying ..... 53. *P. spissa*
Spores and hyphae as above; pore surface drying paler. 52. *P. semitincta*
Spores as above; hyphae septated and clamped
Resupinate *Polyporus dichrous*
Spores cylindric, 2-2.5 μ diameter 20
Spories ellipsoid, oblong, globose, or ovoid 19

19. Pores 3 to 4 per mm; hyphae 2.5-4 μ diameter; yellow, buff-yellow, or cream-yellow when fresh ..... 46. *P. mutans*
Spores ellipsoid, oblong, globose, or ovoid 19
fresh 24

20. Subiculum hyphae neither clamped nor with septa.... 43. *P. gilvescens*
Subiculum hyphae with abundant septa but no clamps 23

21. On wood of coniferous trees; spores cylindric; cystidia 9-16 μ diameter ..... 50. *P. rixosa*
On wood of deciduous trees; spores ellipsoid; cystidia 7.5-10 μ diameter ..... 42. *P. eupora*

22. Sporophore with a distinct, white subiculum (and margin) that contrasts sharply with the dark and rather decidedly merulioid pore surface ..... 51. *P. rufa*
Sporophore with a less distinct subiculum, the pore surface scarcely merulioid ..... 53. *P. spissa*

23. Spores 4-5x2-2.5 μ; pore surface reddish or reddish purple in dried specimens ..... 49. *P. purpurea*

Spores 3-4x1-2 μ; pore surface lilac or lavender when young and fresh, whitish on drying ..... 52. *P. semitincta*

24. Sporophore perennial, the annual layers of tubes easily separable from each other; often blackening on drying
47. *P. nigrescens*
Sporophore annual, never blackening ..... 54. *P. undata*

25. Subiculum hyphae up to 7.5 μ diameter, very thick-walled; pores 5-6 per mm ..... 47. *P. nigrescens*
Subiculum hyphae of narrower diameter, thin-walled; pores smaller ..... 33. *P. subrufa*

SECTION III. FUSCOPORIA

1. Setae absent when cross sections of the tubes are examined 2
Setae present though not necessarily abundant in cross sections of the tubes 9

2. Growing on wood of coniferous trees 3
Growing on wood of deciduous trees 6

3. Growing only on charred wood ..... Resupinate *Trametes carbonaria*
Not growing on charred wood 4

4. Pores averaging 1 to 4 per mm 5
Pores averaging 4 to 8 per mm ..... 69. *P. Tsugina*

5. Sporophore leathery to woody, scarcely pliant; spores 9-12x3-5 μ; hyphae not septated ..... Resupinate *Trametes americana*
Sporophore thin, soft, pliant; spores 5-7x3-5 μ; hyphae with frequent septa ..... 68. *P. subiculosa*
Sporophore thin, soft, pliant; spores 8-12x4.5-7 μ, colored; hyphae septated ..... 44. *P. incrassata*

6. Tubes usually less than 5 mm long each season; perennial 7
Tubes 5 mm or more long; annual 16

7. Sporophore chocolate-brown or blackish brown throughout
63. *P. nigra*
Sporophore with more yellow in its coloration 8

8. Spores brown, 4-5 μ diameter; tubes not stratified; pores averaging 4 to 5 per mm; basidia 5-6 μ diameter; usually on *Ilex* or *Nemopanthus* ..... 60. *P. inermis*
Spores hyaline, 5-8 μ diameter; tubes distinctly stratified; pores averaging 5 to 8 per mm; basidia 7-10 μ diameter; not on *Ilex* or *Nemopanthus* but on a great variety of other hardwoods
67. *P. punctata*

9. Growing on wood of coniferous trees 10
Growing on wood of deciduous trees 12

10. With large, brown setal hyphae 5-12 μ diameter making up most of the tramal and subiculum tissue and ending in large protruding setae in the hymenium ..... 58. *P. ferrugineo-fusca*
Without imbedded setal hyphae 11

11. Subiculum hyphae 3-6 μ diameter; setae short, projecting 15-30 μ beyond the basidia; spores subglobose
Resupinate *Fomes Pini* var. *Abietis*
Subiculum hyphae 2-3 μ diameter; setae elongated, projecting 25-60 μ beyond the basidia; spores cylindric 61. *P. isabellina*

12. Sporophore annual or rarely reviving a second season..... 13
Sporophore truly perennial with downward extension of the tubes each year 17

13. Hymenial setae 30-60x5-9 μ; spores cylindric, 6-7x2-2.5 μ; pores 1 to 3 per mm.....61. *P. isabellina*
Hymenial setae smaller; spores oblong to globose; pores smaller.. 14

14. Pores 6 to 8 per mm; setae 3-6 μ diameter; spores oblong-ellipsoid, hyaline, 4-5x2.5-3 μ.....Resupinate *Polyporus gilvus*
Pores larger, 3 to 6 per mm; setae larger..... 15

15. Tubes less than 5 mm long; spores 4-5x2-3.5 μ, hyaline
59. *P. ferruginosa*
Tubes 5 mm or more long; spores various..... 16

16. Spores 6-8x5-7 μ, golden yellow in KOH; setal hyphae few or lacking, their tips up to 8 μ diameter; sporophore developing under the bark and outer wood layers; usually on *Quercus*....56. *P. Andersoni*
Spores 8-10x4-6 μ, nearly colorless to slightly brownish in KOH; setal hyphae few or lacking, their tips up to 8 μ diameter; sporophore developing under the bark and outer wood layers; usually on *Betula* .....64. *P. obliqua*
Spores 4.5-6x3.5-4.5 μ, greenish yellow to yellowish in KOH; setal hyphae abundant, 8-16 μ diameter at their tips; sporophore not developing under the bark; usually on *Acer*
Resupinate *Polyporus glomeratus*

17. Growing on *Prunus* species of the cherry group; setae 3-6 μ diameter
66. *P. prunicola*
Growing on *Prunus* species of the plum group; setae 6-8 μ diameter
Resupinate *Fomes fulvus*
Growing on other substrata 18

18. Pores averaging 4 to 5 per mm; spores cylindric, 5-7x2-2.5 μ
57. *P. ferrea*
Pores averaging 6 to 8 per mm; spores globose, hyaline; subiculum hyphae not septated.....62. *P. laevigata*
Pores averaging 6 to 8 per mm; spores brownish; subiculum hyphae occasionally septated .....65. *P. pereffusa*

SECTION I. LEUCOPORIA

Poria Aestivale sp. nov.

Annual, effused for several centimeters, soft and coriaceous, inseparable, 1-2.5 mm thick, with a conspicuous, white, thin margin; subiculum practically none, white; pore surface at first white, soon yellowish, distinctly yellow on drying; tubes 1-2.5 mm long, their mouths subcircular, then angular, strongly compound, the surface quite uneven by the lengthening of the walls into *Irpex*-like plates, averaging 1.5 to 2 per mm; spores minute, short-cylindric or narrowly oblong-ellipsoid, smooth, hyaline, 2.5-3.5x1.5-2 μ; cystidia none; basidia 3-4 μ diameter; subiculum hyphae simple or sparingly branched, neither septated nor clamped, the walls considerably thickened, 3-3.5 μ diameter.

On dead wood of deciduous trees. Type collected on a *Fagus* log, in Cook Forest, Clarion Co., Pa., June 23, 1932. Overholts Herbarium 14364; also in Stone Valley, Huntingdon Co., Pa. In both cases overgrowing old *Hymenochaete corrugata*. The decay produced is of the white type.

The species is likely to be mistaken for *P. versipora* or a resupinate form of *Polyporus Tulipiferae*, from both of which it differs in the smaller spores, the more yellow coloration on drying, and the longer tubes.

2. PORIA AMBIGUA Bres. Atti Accad. Rovereto III. **3**: 84. 1897.

Annual, usually effused in elongated or orbicular patches 3-10 cm. long, sometimes very widely effused, or in wide areas on the ground around stumps, often nodulose on vertical substrata, inseparable, usually with a white, sterile, short-pubescent margin 2-2.5 mm wide, soft-membranaceous; subiculum thin, soft, white, inconspicuous; pore surface pure white to dirty white when fresh, often cinnamon-buff to cinnamon in dried specimens, the tubes 0.5-6 mm long, rarely as much as 1 cm, very thin-walled and finally ciliate-dentate, averaging 1 to 3 per mm, sometimes inversely conic; spores always abundant, ellipsoid or oblong-ellipsoid, smooth, hyaline, 4-6x2.5-3.5 μ; cystidia none or very inconspicuous; subiculum hyphae branched, thin-walled, with numerous septa, no clamps, up to 6 μ diameter.

On dead wood of deciduous trees. Not common in Pennsylvania. This species produces a white rot and apparently affects only the sapwood. The diagnostic characters of the species appear to include the soft, white consistency, the inverted-conic shape of many of the tubes, the lack of cystidia, and the branched subiculum hyphae that are thin-walled with abundant septa but no clamps. Occasionally it spreads widely over the vertical surfaces of stumps and snags and may even grow on the surface of the soil. *P. corticola* is often quite similar but can usually be differentiated on the definite cystidia of that species. Resupinate *Polyporus Tulipiferae* is similar at times but has heavily incrusted cystidia of cylindric shape, the hyphae have partly thickened walls, are less abundantly septated, and clamps are occasionally present. *P. salicina* Murr. (*P. Sumstinei* Seaver) and *P. lacerata* Murr. are synonyms.

3. PORIA ANEIRINA (Sommerf.) Cooke, Grevillea **14**: 112. 1886.

Annual, effused in small, orbicular or elongated patches, closely adherent, soft and somewhat ceraceous when fresh, hardening and sometimes somewhat resinous or cartilaginous on drying, at first with a conspicuous white, adnate, thin margin, finally fertile

to the edges; subiculum white, very thin; pore surface white or yellowish when fresh, becoming brownish where handled in fresh condition and drying decidedly yellowish to pale bay; tubes 0.5-1 mm long, their mouths angular, thin-walled, entire, slightly dentate or occasionally irpiciform, averaging 2 to 3 per mm, or occasionally somewhat larger by confluence and often elongated and gaping in oblique situations; spores ellipsoid or ovoid, smooth, hyaline, 3.5-6x2.5-3.5 μ; cystidia none; basidia 4 μ diameter; subiculum hyphae simple or sparingly branched, with rather abundant septa and clamps, 2.5-4.5 μ diameter, thin-walled.

On dead decorticated wood of *Populus*. The species has not been found in Pennsylvania but is of wide distribution in the northern United States and Canada, and seems to be confined to the wood of *Populus*. I have had specimens determined by Romell and by Pilat. I do not find the subiculum hyphae to be incrusted as stated by Baxter. It produces a white rot of the sapwood.

4. PORIA ASIATICA (Pilat) n. comb.

Effused for several centimeters, annual, 0.5-2 mm thick, separable, membranaceous, at first with a very narrow, irregular, slightly pubescent margin that in dried specimens has a slight tendency to become revolute and so loosening from the substratum, when mature the margin entirely fertile; subiculum visible only as a thin, milk-white layer about 0.25 mm thick; pore surface white when fresh, somewhat yellowish on drying, the tubes up to 3 mm long (usually about 0.5 mm), their mouths angular, the walls thin and slightly toothed or lacerated, 2.5 to 4 per mm, often oblique and gaping; spores oblong or short-cylindric, sometimes slightly curved, smooth, hyaline, 3-4x1.5-2 μ; cystidia abundant as projecting, hyaline, thick-walled, lance-shaped or obtuse structures that sometimes are capitate-incrusted, 4.5-8 μ diameter; subiculum hyphae sparingly branched, with walls partially thickened, septa and clamps present but not abundant, only the lumen taking the stain, 2.5-6 μ diameter.

On dead wood of coniferous trees. The species is rare in Pennsylvania, being represented by a single collection. Otherwise it is known to occur in New England, Ontario and the far Northwest. The name is almost new to American mycology, being first reported in a recent paper from this laboratory. I had it in my herbarium for many years before it was sent to Pilat at Prague who determined it for me. The cystidia are the prominent feature of the species. A brown, carbonizing decay accompanied two of the collections in my herbarium.

5. PORIA CALLOSA (Fries) Cooke, Grevillea **14**: 110. 1886.

Annual, usually widely effused though often beginning in orbicular patches, separable in sheets, tough when fresh, corky or rigid on drying, sometimes somewhat cheesy with age, 3-10 mm thick, the margin thinning out, usually abrupt, white; subiculum 1-3 mm thick, white, firm; pore surface white to gray or avellaneous, scarcely changing on drying, the tubes 2-5 mm long, their mouths typically rather thick-walled and entire but in oblique situations becoming thinner and more irregular, circular to somewhat angular, averaging 2 to 4 per mm; spores cylindric with both ends typically pointed, smooth, hyaline, 4-8x2-2.5 μ; cystidia none or in non-sporulating portions of the hymenium represented by some narrow, sterile organs that sometimes bear small beads of crystals; main hyphae of subiculum simple, with thickened walls, neither septated nor clamped, unstaining, 4-5 μ diameter; also with smaller staining hyphae 2-3.5 μ diameter, with scattered septa and clamps.

On dead wood of coniferous trees and occasionally on *Quercus* and perhaps other hardwoods; not infrequent on structural timbers in bridges, roofs, floors, etc.

This species is scarcely more than a thin resupinate form of *Trametes serialis*. Specimens of *Poria monticola* Murrill were sent to Pilat who referred them to *P. callosa* as I had previously done. While the earlier use of the name *P. callosa* has seen much variation, this is the application of the name at present in Europe, except that Bourdot and Galzin give it the name *T. serialis* var. *resupinata* with *P. callosa* as a synonym, and Donk refers the name in synonymy to *Trametes serialis*. It is an important decay of coniferous timbers, especially structural wood, producing a brown rot that is in no wise different from that produced by *T. serialis*.

6. PORIA CANDIDISSIMA (Schw.) Cooke, Grevillea **14**: 109. 1886.

Annual, effused for only a few centimeters, at first as suborbicular patches, flocculent or membranaceous, up to 1 mm thick, separable, fragile and easily tearing when fresh, with a well-developed, membranous, white, mycelioid margin; subiculum white, papery-thin; pore surface white when fresh, slightly yellowish on drying, the tubes up to 1 mm long, frequently growing in oblique situations and with the mouths gaping and becoming lacerated or even irpiciform, thin-walled, often finely ciliated, averaging 3 to 4 per mm or somewhat confluent and 2 per mm; spores subglobose or broadly ellipsoid, finely echinulate, hyaline, 2.5-4 μ diameter; cystidia none; subiculum hyphae hyaline, somewhat branched, thin-

walled, with rather inconspicuous septa and clamps, 2-3.5 μ diameter, occasionally with bulb-like enlargements next a septum, sometimes somewhat incrusted.

On bark of well rotted wood of deciduous and coniferous trees. In some of the European literature this species passes as *P. hymenocystis* Berk. and Broome. Bourdot and Galzin call it *P. subtilis* Fries. Schweinitz's name antedates the Berkeley and Broome name and the name *P. subtilis* is a bit uncertain, judging from the original description. The small echinulate spores are the feature of the species. *P. arachnoidea* Murr. from Louisiana belongs here rather than under *P. mollusca*, as does also *P. submollusca* Murr.

7. PORIA CANESCENS Karst. Rev. Mycol. **9**:10. 1887.

Annual, effused, with a thin, creamy, farinose margin, membranaceous, tough, drying rigid; subiculum inconspicuous, white; pore surface white to isabelline-canescent, becoming immediately darker where bruised and somewhat darker on drying; tubes 0.5-2 mm long or longer in oblique situations, the mouths angular, thin-walled, entire, averaging 2.5 to 3 per mm, sometimes more oblique and gaping and then somewhat larger; spores oblong-ellipsoid or strongly oblong, hyaline, 4-5x2-3 μ; cystidia none; hyphal pegs present; subiculum hyphae 3.5-4 μ diameter, the walls completely thickened, no septa nor clamps; basidia 5-6 μ diameter, ob-pyriform.

On dead wood of deciduous trees, especially Alnus. Baxter gives a wide distribution for this species and, though no specimens from Pennsylvania appear in our herbaria under this name, it must certainly occur within the state. My *P. aestivale* is similar microscopically except for the much smaller spores, and macroscopically it differs in the definitely yellowed coloration assumed on drying.

8. PORIA CINERESCENS (Bres.) Sacc. Syll. Fung. **16**:161. 1902.

Annual, effused in small patches 3-10 cm broad, membranaceous-tough when fresh, drying rigid, separable, at first with a narrow, white, slightly raised, floccose-membranaceous border; subiculum thin, soft, white, inconspicuous; pore surface white to gray or becoming isabelline or slightly yellowish in the herbarium, the tubes 1-3 mm long, their mouths at first subcircular and rather thick-walled, then thinner and more or less angular, entire or somewhat dentate, averaging 3 to 5 per mm; spores cylindric, hyaline, slightly or not at all curved, 4.5-6x1.5-2.5 μ; cystidia none; hyphae of subiculum more or less branched, at least the larger with somewhat thickened walls, with scattered septa and clamps, 2-4 μ diameter, often becoming greenish yellow to canary-yellow in KOH.

On rotten wood of coniferous and deciduous trees. This species has not been collected in Pennsylvania but occurs widely distributed in the conifer regions of the northern United States and Canada, and undoubtedly occurs within the limits of this manual. It has somewhat the appearance of a resupinate *Polyporus* of the *P. hirsutus or P. versicolor* type. Although usually listed in Europe as only on coniferous wood, yet an American species on hardwoods that cannot be differentiated from the coniferous wood form is frequently collected and must be referred here. It is a tougher species than *P. sericeo-mollis* and with a more cinerescent pore surface. The spores are not of the very narrow allantoid type characteristic of a number of similar white porias, but of the broader type that measure more than 1 μ diameter.

A brown rot accompanied a considerable number of the collections, and the fungus is believed to be of considerable importance as a decayer of slash of coniferous trees.

9. **Poria conferta** sp. nov.

Effused, tough, coriaceous, not very watery, inseparable, with a white, thick and distinct but irregular, pubescent margin; pore surface at first grayish white, then (at least on drying) grayish isabelline or tinged yellowish, sometimes almost avellaneous; subiculum indistinct, white or whitish; tubes up to 6 mm long, the mouths at first pubescent then glabrous, thick-walled, entire, becoming slightly angular at maturity, 2 to 3 per mm; spores broadly ellipsoid or subglobose, smooth, hyaline, thin-walled, 4.5-6x3.5-4 μ; sterile organs broadly fusoid, 10-12x5-6 μ; basidia pyriform, 6-8 μ diameter; subiculum hyphae nearly simple, the walls thickened, 2-3 μ diameter, neither clamped nor septated; taste mild.

On dead wood of coniferous trees. The type collection of this species was made at Cook Forest, Forest Co., Pa., Sept. 18, 1937. Overholts Herbarium 21040. Also collected at Gray's Run, Lycoming Co., Pa., May 27, 1939.

The diagnostic characters appear to be the pointed organs in the hymenium, the small diameter hyphae, and the large basidia. There is no chalkiness to the pore surface of dried specimens and it differs otherwise from *P. xantha.* The decay associated with the sporophores is a wet, soggy, white rot.

10. PORIA CORTICOLA (Fries) Cooke, Grevillea **14**: 113. 1886.

Annual, broadly effused for many centimeters where best developed, separable when mature but young specimens apparently adnate, soft and watery when fresh, typically with a thin, pubescent, narrowly sterile margin; subiculum inconspicuous, white;

pore surface white when fresh, often yellowish or cinnamon-buff on drying; tubes 2-5 mm long, the mouths often glistening, angular, very thin-walled, entire or becoming finely dentate-lacerate, averaging 2 to 4 per mm; spores ellipsoid or oblong-ellipsoid, smooth, hyaline, commonly showing a tendency to cohere in groups of two to four, 4.5-5.5x3-3.5 μ; cystidia various but usually present, either as fusoid projecting bodies, as smaller, fusoid, capitate-incrusted organs, or as entirely projecting incrusted organs, all 3-7 μ diameter; hyphae simple or sparingly branched, with occasional septa but no clamps, thin-walled, 3-6 μ diameter.

On dead wood of deciduous trees. A rather common species in Pennsylvania and widely distributed in the United States. The species is associated with a white rot of the substratum.

11. PORIA CRASSA (Karst.) Sacc. Syll. Fung. **9**: 190. 1891.

Perennial, effused for several centimeters, inseparable, the first year's growth consisting of a rather tough and flexible layer of tubes 1-3 mm long, seated on a definite white subiculum up to 1 mm thick, and if on a rough surface the mycelium penetrating the wood and massing there to form a resinous pseudo-subiculum which seems to be added to by a filling of the old tube layers with material of the same sort, usually becoming somewhat cheesy or waxy in consistency, occasionally somewhat chalky, the whole attaining a thickness of 1 cm or more; older annual layers separated by dark, narrow, and not very distinct brownish lines, assuming a more or less resinous character; pore surface pure white when fresh, scarcely changing in drying or becoming gray or a trifle sordid, the tubes attaining a total length of as much as 1.5 mm, often becoming brownish within and usually banded by brown zones; pores subcircular or a trifle angular, thin-walled, entire, averaging 5 to 7 per mm; spores ellipsoid to narrow-ellipsoid, smooth, hyaline, 4-5x2.5-3.5 μ; cystidia as narrow, sharp-pointed, paraphysis-like organs, 4-7 μ diameter; basidia 5-7 μ diameter; subiculum hyphae sparingly branched, mainly 3-4 μ diameter, septa and clamps rarely seen, usually a few hyphae with completely thickened walls, 4-6 μ diameter; needle-shaped crystals and abundant oil globules usually present in crushed mounts or sections, and typically pieces of the tissue exuding a milky, oily material into water after treatment with alcohol; taste bitter; odor typically that of rancid lard.

On dead wood of coniferous trees; occasionally on hardwoods; often on the vertical faces of stumps and snags. A common species throughout the conifer region of the United States. Collections are present from many localities throughout the northern United States and Canada.

A specimen from Karsten, at New York, shows the characters of the species as I interpret it, except that there are no spores. From *P. xantha* the species differs in the white coloration of the pore surface, the ellipsoid spores, and larger basidia.

This species seems nowhere to have been adequately described. Many years ago I sent it to Bresadola who was unable to name it. More recently a number of specimens have been referred to *P. crassa* by Pilat and he has sent me a number of European collections under this name. It is not, however, the interpretation of that species as presented by Baxter which seems to have been the interpretation of Romell, Egeland, and others in northern Europe, that is, that *P. crassa* is only a thick form of *P. xantha*. That assignment calls for allantoid spores.

The white exudation produced in water is a character not commonly seen in *Poria* but does occur in the case of a few other species, including old sporophores of *P. xantha*. In a few cases I have not been able to obtain this phenomenon from specimens. I am also doubtful about the type of rot produced. Some specimens are associated with a brown type of decay; others with one of the white rots. In only about one third of the more than 30 collections in my herbarium have I been able to obtain spores. The oily material present in sections is not conducive to the best microscopic examination.

12. PORIA DECOLORANS (Schw.) Cooke, Grevillea **14**: 113. 1886.

Annual, effused in small confluent patches of only a few centimeters, separable, coriaceous, drying hard; subiculum membranaceous, distinct, pallid; pore surface gray and discoloring darker towards avellaneous on drying—hence quite cinereous in dried specimens; tubes very short, the mouths subangular, thin-walled, entire, averaging 4 to 5 per mm; spores globose, smooth, hyaline, 5-6 μ diameter; incrusted, crystalline masses, some imbedded and some projecting somewhat, 7-10 μ diameter, are present in the tube bases and the adjacent subiculum and might be regarded as encrusted cystidia; hyphae thin-walled, with a staining content, somewhat branched, with occasional septa but no clamps, 5-6 μ in diameter.

On fallen wood of deciduous trees. This is probably a rare species and of limited range. One collection is known from Pennsylvania aside from the original collection by Schweinitz. The pore surface is dark enough to belong to *Polyporus adustus* but in every other character it is different.

13. **Poria discolor** sp. nov.

Annual, effused for several centimeters, inseparable, coriaceous-soft, sterile margin practically none; subiculum white or pallid, extremely thin, scarcely visible in dried specimens; pore surface at first grayish white, discoloring all over to dirty avellaneous on drying or with a slight grayish cast; tubes 3-4 mm long, their mouths angular and very thin-walled, entire, collapsing somewhat on drying, averaging about 3 per mm; spores globose or subglobose, smooth, hyaline, very thin-walled and collapsing, 4.5-5.5x3.5-4 μ; cystidia none; subiculum hyphae with walls partly thickened, neither septated nor clamped, 3-5 μ diameter.

On dead wood of deciduous trees. The type of this species was collected near Belsano, Cambria Co., Pa., on an old hardwood log, Oct. 6, 1934. Overholts Herbarium 19332. No other specimens are known.

The species has the microscopic characters of *P. subacida* but superficially it is very different. It is not so tough as that species and discolors very strongly on drying, and the walls of the tubes are very thin. There are no notes on the fresh specimens but they give the impression of a rather soft and watery species. A white rot was associated with the specimens.

14. **Poria elongata** sp. nov.

Annual, effused for 10 cm. or more, inseparable, tough when fresh, drying brittle but firm, the margin thinning out and narrowly fimbriate; subiculum white, less than 0.5 mm thick, quite soft when soaked up; pore surface white when fresh, strongly yellowed on drying, the tubes 4-12 mm long, their mouths thin-walled, entire, averaging 4 to 5 per mm; spores oblong-ellipsoid or broadly ellipsoid, smooth, hyaline, 4-5x3-3.5 μ; cystidia none; hyphae of subiculum very much collapsed, 2-4 μ diameter, thin-walled, staining, with occasional septa and inconspicuous clamps; odor and taste none.

On old logs of deciduous trees. The type of this species is a collection made in the Allegheny National Forest, near Kane, Pa., on an old *Acer* log, Oct. 3, 1936. Overholts Herbarium 21129. A second collection is from Grampian, Clearfield Co., Pa., and a third from Pocono Lake, Monroe Co., Pa.

The specific name chosen for this species alludes to the unusually long tubes of the fungus. In neither the second nor the third collection do they reach the lengths of the type collection, their measurements running in the lower part of the range given. The species produces a white rot.

15. PORIA FIMBRIATA (Pers. ex Fries) Lloyd, Myc. Notes **52**:740. 1917.

Broadly effused, annual, separable as a distinct, continuous membrane, at first appearing as a pure white, orbicular patch with even surface and a strongly fimbriate margin, the central region then occupied by minute, dome-like or pustulate, cream-colored or avellaneous warts that soon open as cupulate pores, finally becoming so numerous and so crowded as to present an entirely poroid appearance and then not to be differentiated from other species except perhaps in the continued production of shallow pores on the margin; pores up to about 300 μ deep, the mouths truncated, the walls rather thick and entire, averaging 4 to 6 per mm, finally often becoming somewhat hydnoid and thin-walled; spores elongate-ellipsoid or short-cylindric, smooth, hyaline, 3.5-5x3-3.5 μ; cystidia none; subiculum hyphae thin-walled, rarely branched, 1-2 μ diameter, neither septated nor clamped.

On dead wood of deciduous and rarely coniferous trees; usually on quite rotten wood; occasionally on old fungi.

This is a common species and easily recognized by the peculiar character of the tubes in the young stages, and by the very narrow hyphae, the separable membranous subiculum, and the fimbriate margin. Apparently Persoon first described the species in the genus *Poria;* later it was transferred to *Porothelium* by Fries. I agree with Lloyd that the genus *Porothelium,* if based on species of this sort, is superfluous. Mature specimens do not differ materially from other species as to be recognizable as belonging to a separate genus.

The species usually grows on well-rotted wood or bark and the character and importance of the decay are not known, but it has never been found associated with a brown cubical type of decay.

16. PORIA FIMBRIATELLA (Peck) Sacc. Syll. Fung. **6**:303. 1888.

Annual, effused for 5-15 cm, separable, tough, sometimes with a narrow, white, subfimbriate margin that may bear white, rhizomorphic strands; subiculum very thin, white, scarcely discernible in mature specimens; pore surface whitish inclined to cream-color when fresh, cinnamon-buff to warm-buff or light ochraceous buff in herbarium specimens; tubes up to 2 mm long, their mouths more or less angular, thin-walled, sometimes lacerated and the pore surface somewhat irpiciform, averaging 4 to 5 per mm; spores ellipsoid, smooth, hyaline, 2.5-3.5x2 μ; cystidia abundant, elongated, 10-15 μ diameter at the thickest part, projecting prominently for 10-30 μ, the tips pointed and incrusted with coarse crystals; hyphae

nearly simple, the walls much thickened, 2-4 μ diameter, with neither septa nor clamps.

On dead wood of deciduous trees. A rare species in the East; a single collection from Pennsylvania. The cystidia and the very small spores make this species easily recognizable.

17. PORIA INFLATA Overh. Proc. Penna. Acad. Sci. **13**: 123. 1939.

Widely effused, separable, mostly in characteristic orbicular patches 5-15 cm broad, the surface irregular or tuberculate, 2-10 mm thick, the margins thinning out, white when fresh, on drying varying from dirty cream to smoky isabelline, with a peculiar nauseating odor when fresh, in consistency somewhat cheesy-membranaceous but drying hard and rigid; tubes 1-2.5 mm long, their mouths circular, thick-walled, entire, averaging 4 to 6 per mm; subiculum 1-7 mm thick, white; spores ellipsoid, smooth, hyaline, 4-5x2.5-3 μ; cystidia none; subiculum hyphae very variable, with right-angled branching, thin-walled, often collapsed, septated but not clamped, varying from 3 to 12 μ diameter, the larger usually taking the phloxine stain with avidity, the smaller not staining.

On dead wood of deciduous trees, especially *Quercus*.

Campbell and Davidson inform me that it is associated with a brown rot of living *Quercus* in the South and Middlewest.

18. PORIA LENIS Karst. Medd. Soc. Faun. Fl. Fenn. **14**:82. 1887.

Annual, effused for several centimeters, separable, with a very thin, soft, white-mycelioid margin at first, this entirely disappearing in mature plants, coriaceous or softer; subiculum very thin, practically indiscernible, white, usually extended into the very rotten substratum as white, soft mats of mycelium; pore surface white when fresh, often becoming yellowish, gray, light buff, or cartridge-buff on drying, somewhat glistening, soft and even to the touch; tubes 0.5-2.5 mm long, their mouths angular, the walls thin and nearly or quite entire, averaging 4 to 7 per mm, barely visible to the unaided eye; spores lunate, strongly curved or hook-shaped, hyaline, smooth, 3-5x1-1.5 μ; cystidia scarcely noteworthy but occasional pointed narrow organs 3-5 μ diameter are present in the hymenium; hyphae nearly simple, the walls partly thickened, 2-4 μ diameter, neither clamped nor septated; rarely a few smaller hyphae with inconspicuous clamps.

On dead wood of coniferous trees. A common species in the conifer region of the United States and Canada. The species is easily recognized by the strongly lunate spores. *Poria lunata*

Romell, *P. luteoalba* Karst., *P. calcea* (Fr.) Bres., and *P. vulgaris* Auct., all seem to be synonyms.

It is a soft species and in that character differs from *P. subincarnata* which has a hardness that is quite at variance with the soft consistency of *P. lenis*. The spores of *P. subincarnata* are curved-allantoid or nearly straight but not with the hooked-curving of *P. lenis*. Likewise *P. subincarnata* has hyphal pegs in the pores while *P. lenis* does not. Although the pore sizes vary in *P. lenis*, I have been unable to find a correlated character that would justify the recognition of any segregates from the material referred here.

P. lenis is associated with a soft white decay of the wood which Baxter describes as occurring in microscopic or macroscopic pockets.

19. **Poria magnahypha** sp. nov.

Annual, at first in orbicular patches as much as 12 cm broad, then sometimes confluent but often remaining distinct, separable only with difficulty, tough-membranaceous, at first consisting of a thin tough membrane about 0.5 mm thick with pores developing in a centrifugal manner from center to margin, none seen without a broad sterile marginal band; pore surface isabelline or avellaneous over the center in both fresh and dry condition, the tubes less than 0.5 mm long, their mouths more or less alveolar, mainly about 1 mm broad but some larger and some considerably smaller, thin-walled, rather even and entire; spores subcylindric, smooth, hyaline, 8-10x3.5-4 μ; cystidia none; hyphae of subiculum variable in size, mostly 4-6 μ diameter, with much thickened walls, neither septated nor clamped; others (especially along the substratum) much larger, 10-20 μ diameter, with heavily thickened walls, occasionally septated.

On the bark of dead *Fagus*. The type collection was made at Duhring, Allegheny Nat. Forest, Elk Co., Pa., July 30, 1939. Overholts Herbarium 22038. No information is at hand concerning the type of decay produced.

20. PORIA MOLLUSCA (Pers.) Bres. Atti Accad. Rovereto III. **3**:66. 1897.

Annual, effused in small patches, rather soft, separable as a floccose membrane, with a thin, fimbriate, cream-colored, mycelioid margin, attaining a total thickness of about 1 mm; subiculum very indistinct, white; pore surface deep cream or ochraceous straw-color in the herbarium, perhaps white when fresh, the tubes up to about 1 mm long, their mouths angular, thin-walled, somewhat denticulate-pubescent, averaging 2 to 4 per mm; spores subglobose

or broadly ellipsoid, smooth, hyaline, 2.5-3.5x2-2.5 μ; cystidia none; subiculum hyphae thin-walled, sparingly branched, with scabrous or finely incrusted walls, 3-4.5 μ diameter, with occasional septa and clamps.

On very rotten wood of both conifers and hardwoods. My concept of this species is obtained from a specimen determined by Litschauer, a specimen from Romell, and determinations made for me by Pilat, with which seem to agree about half a dozen collections from the eastern United States and Canada. No Pennsylvania collections have been made, but it seems likely that the species occurs here. The soft consistency, the separable character, the color, and particularly the small spores are diagnostic characters.

The occurrence of this fungus on very rotten wood renders impossible any evaluation of its importance as a decay producer or the type of decay produced.

21. PORIA MYCELIOSA Peck, N. Y. State Mus. Bull. **54**: 952. 1902.

Annual, effused for 2-12 cm or more, separable in thin, delicate sheets, with a broad, white, sterile, fimbriate margin that usually gives off rhizomorphic strands that follow along the surface of the substratum or become imbedded in it; subiculum thin, white, scarcely discernible in mature specimens; pore surface white to pale yellow when fresh, becoming pinkish buff or cinnamon-buff in the herbarium; tubes scarcely 0.5 mm long, first appearing as shallow depressions in the subiculum, the mouths angular, thin-walled, dentate, averaging about 3 per mm, but occasionally confluent and up to 1 mm diameter; spores broadly ellipsoid or subglobose, smooth, hyaline, 3-4x2-3 μ; cystidia none; subiculum hyphae thin-walled, 2-3.5 μ diameter, with more or less of right-angled branching, rather abundantly septated and clamped.

On rotten wood of coniferous trees or occasionally on hardwoods. I have but a single collection from a hardwood substratum. The species is probably of no importance in timber decay since it grows only on well rotted substrata. The thin, separable mycelial mat, the short tubes with rather large and irregular mouths, the small spores and the branched and septated hyphae are the characters of the species. Peck gives the color of fresh pore surfaces as light yellow; a collection of my own was definitely white in maturing specimens; Murrill says of *P. perextensa* (a synonym here) that the colors pass from white to ochroleucous and isabelline. I am therefore classing the species as in the white rather than the colored section of *Poria*. Further studies may show that it is better placed elsewhere.

In general appearance the species is quite similar to *P. mollusca* but differs in the abundant development of rhizomorphs and in lacking the incrustations on the hyphae of that species.

22. **Poria notata** sp. nov.

Annual, broadly effused for 15 cm or more, ceraceous when fresh, drying rigid and brittle, with a very narrow, mycelioid, white margin when young, scarcely separable, the growth more or less irregularly interrupted; subiculum white, less than 0.5 mm thick; pore surface white or creamy when fresh, drying deep cream or a bit yellowish, the tubes oblique and about 1 mm long, gaping, very thin-walled, irregular, more or less angular, 2 to 4 per mm; spores allantoid, curved but not lunate, hyaline, 4-5x1-1.5 μ; cystidia none; hyphae of subiculum with much thickened and gelatinized walls, the lumen only staining and likely to be mistaken for the whole hypha, with occasional clamps and septa, 3-4 μ diameter, and with a few very narrow hyphae about 2 μ diameter; in contrast, the hyphae of the growing margin are much branched, thin-walled, staining readily, septated, clamped, 4-7 μ diameter; taste bitter.

On old hardwood logs. The type of this species was collected along Rock Run, near Ralston, Lycoming Co., Pa., June 3, 1938. Overholts Herbarium 21135.

Some of the characters of this species are those of *P. lenis*. The irregular and dentate mouths of the tubes that are of considerably larger size, the softer texture when fresh, the bitter taste, and the hyphal characters are different. The fungus is associated with a soft, straw-colored decay of the wood.

23. PORIA ODORA (Peck) Sacc. Syll. Fung. **6**:294. 1888.

Annual, effused for 10 cm or more, with an abrupt, narrow, sterile, reddish yellow margin, tough, separable; subiculum conspicuous but thin, white; pore surface white when fresh, more or less cinnamon-buff or clay-colored in herbarium specimens, suffused with a grayish pruinosity when fresh; tubes 2-4 mm long, their mouths angular, rather thin-walled, entire, averaging 5 to 7 per mm; spores allantoid, smooth, hyaline, 3-4x0.75-1 μ; basidia 2-3 μ diameter; cystidia none; subiculum hyphae nearly simple, hyaline, 3-7 μ diameter, thick-walled, neither clamped nor septated.

On dead wood of coniferous trees. This is a little-known species. I have half a dozen collections so referred on the basis of a general appearance of *P. undata* and *P. nigrescens* but with minute pores, allantoid spores, and thick-walled hyphae of large diameter. It would seem to belong to the white section rather than the colored.

24. **Poria oleagina** sp. nov.

Perennial and with a maximum of 4 or 5 years growth, adnate, effused for several centimeters, rather coriaceous to the feel but cutting more firm or cheesy, drying hard and brittle, thinning out on the margin to a thin white membrane; pore surface white when fresh, becoming a uniform buff-brown or cinnamon on drying, the tubes oblique, and 3-4 mm long per season, attaining a total thickness in this region of almost 1 cm, not very definitely stratified, the bases being stuffed and rather indistinct with age; mouths angular, thin-walled, entire, averaging 5 to 6 per mm; spores cylindric, scarcely curved, smooth, hyaline, 4-5x1.5 μ; cystidia as narrow, fusoid organs between the basidia, 4-6 μ diameter; hyphae thick-walled, somewhat branched, no septa nor clamps; tissue giving off a milky, oily exudate when transferred from alcohol to water for softening; taste bitter; odor none.

On dead wood of coniferous trees. The type of this species was collected at North Conway, N. H., on an old coniferous log, Aug. 10, 1920, by W. H. Snell (No. 557). Overholts Herbarium 6077. Additional specimens are at hand from New York, Pennsylvania, and Michigan.

The Michigan specimen mentioned above was said to be on *Salix*. The above description follows in considerable detail that of *P. crassa*. The darker color of the pore surface in the dried condition and the cylindric spores are the main separating characters. The absence of a resinous appearance may also be a useful character, but the presence of an oily material and the bitter taste are characters common to the two species. This is certainly not *P. xantha;* the colors of the two differ widely, and the spores are not cylindric in that species. Of the four collections in my herbarium only the type has spores.

The character of the decay produced is in doubt. The mycelium masses below the sporophore and therefore little or no wood is ordinarily removed with the specimen. In one collection the subtending rot is definitely brown.

25. PORIA OVERHOLTSII Pilat, in Overholts, Proc. Penna. Acad. Sci. **13**:124. 1939.

Annual, broadly effused for 5-15 cm, separable, with a distinct white or slightly bluish-white sterile margin, with some development of mycelial cords, soft; subiculum very thin, white, floccose-membranous; pore surface white when fresh, drying white to distinctly yellowish or pale buff, the tubes up to 1 mm long, the

mouths angular, thin-walled, entire, averaging 2 to 3 per mm; spores oblong-ellipsoid, smooth, hyaline, 5-6x3-4 μ; cystidia none; hyphae of subiculum thin-walled, septated and clamped, 2.5-4 μ diameter.

On dead and rotten wood of *Quercus*. Three collections are now known, all on *Quercus*. Microscopically the species has the characters of *P. aneirina* but macroscopically it is very different, and is more similar to *P. myceliosa* from which the spores provide ample differentiation. The fungus produces a white decay of the underlying sapwood.

26. PORIA PAPYRACEA (Schw.) Cooke, Grevillea **14**: 111. 1886.

Annual, thin, effused in small elongated or circular patches 2-7 cm long and broad, with a conspicuous white sterile margin 1 mm or more broad, separating with difficulty as a thin tough membrane; subiculum white, thin, tough; pore surface white when fresh, drying isabelline to grayish avellaneous or with a slight tint of flesh-color; tubes not more than 0.5 mm long, the mouths angular or subcircular, very regular and entire, rather thin-walled, averaging 2 to 3 per mm; spores cylindric, hyaline, spinulose or echinulate, 14-18x5-6 μ; cystidia none; basidia 8-10 μ diameter; subiculum hyphae nearly simple, thin-walled, neither septated nor clamped, 3-4.5 μ diameter.

On bark of *Thuja occidentalis* and *Vitis*. The species is not known from Pennsylvania except from Schweinitz's record of its occurrence at Bethlehem, Pa., but is present in New Jersey and New York and may be expected here. The habitat, the large regular pores, and the characteristic spores and large basidia make this species at once recognizable.

No marked changes have occurred in the wood underlying the sporophores in any of my collections. The species is probably not of much importance as a decay organism.

27. PORIA RETICULATA (Pers. ex Fries) Cooke, Grevillea **14**: 114. 1886.

Annual, effused for only a few centimeters, very thin, floccose-fragile, inseparable, with a very thin, adnate margin; subiculum extremely thin, practically indiscernible; pore surface white or cream-color when fresh, with short, alveolar tubes less than 1 mm long, the mouths circular to angular, usually 2 to 3 per mm; spores cylindric, hyaline, curved, 6-8x3-4 μ; cystidia none; in section very distinct, composed of a region of densely interwoven hyphae in the tramal portion, arising from a loose subiculum 80-160 μ thick, that is composed of nearly parallel hyphae, branching upwards,

with rather abundant septa but no clamps, 3-6 μ diameter, bearing scattered, rather coarse crystals.

On dead wood of deciduous trees, especially *Populus* and *Salix*. A rare species. I have a specimen collected and determined by Lundell and communicated to me by Buchwald and a specimen from Iceland collected by Buchwald and determined by Bourdot. With these agree in entirety a Pennsylvania collection on *Populus*, and two others on undetermined substrata, one from Ontario, and one from Ohio. The spores are distinctive in this species, though one of my collections yields shorter spores than the others and possibly may be different.

Usually occurring on much decayed wood, there is little information available as to the importance of the species in decay, or as to the type of rot produced.

28. PORIA SERICEO-MOLLIS (Romell) Baxter, Papers Mich. Acad. Sci. **6**:72. 1926.

Annual, effused for as much as 30 cm at times but more often less than 10 cm, soft to rather firm but somewhat watery when fresh, drying fragile, with a narrow, white-pubescent margin not more than 1 mm broad in young plants, separable and often loosening in drying; subiculum thin, white, practically disappearing; pore surface white or occasionally with a tinge of pinkish or very pale lavender, discoloring slightly where wounded, on drying remaining white or becoming somewhat cream-colored; tubes 1-5 mm long, their mouths angular to subangular at maturity, becoming thin-walled, entire, averaging 3 to 4 per mm; spores cylindric, smooth, hyaline, not curved, 4-5x1.5-2.5 μ; cystida none; subiculum hyphae with walls partly thickened, non-staining, septated and clamped, 3.5-4.5 μ diameter, and with some smaller staining hyphae 2-3 μ diameter; odor none; taste only fungoid.

On dead wood of both coniferous and deciduous trees; often on exposed heartwood of living *Prunus serotina*. A rather common species in Pennsylvania. Although reported only on conifers by Baxter and by Europeans, this species occurs also on *Prunus serotina* and possibly other hardwoods. It is worthy of note that *Prunus serotina* seems to act with considerable regularity as a substratum for a number of species that otherwise inhabit only coniferous substrata. All of these are of the type that produce brown rots of the wood.

P. cinerescens is somewhat similar to this but is of tougher consistency and becomes more strongly cinerous on drying. My concept of the species is based on material from Romell and on a speci-

men determined for me more recently by Pilat. It is to be noted that the spores of this species are neither of the lunate type (shown by *P. lenis*) nor of the very narrow type scarcely more than 1 μ diameter, characteristic of a number of related species. Romell, Baxter, and perhaps others describe a *Ptychogaster* stage for this species. *P. sericeo-mollis* produces a brown rot.

29. **Poria sinuascens** Pilat, sp. nov. in litt.

Annual, effused for 10-15 cm, inseparable when on bark, separating rather easily from the surface of wood, tough when fresh, at first with a thin, delicate pubescent border; subiculum practically none, white; pore surface pure white to pale cream-color when fresh, becoming pinkish cinnamon to pale bay on drying; tubes 1-2 mm long, their mouths thin-walled, angular, even, averaging 3 to 4 per mm; spores cylindric, only slightly if at all curved, hyaline, 3-4x1-1.5 μ; cystidia none or represented only by occasional, narrow, pointed, sterile organs 4-5 μ diameter; subiculum hyphae nearly simple, walls completely thickened, with neither septa nor clamps, 2.5-3.5 μ diameter.

On dead wood or bark of coniferous trees. Although Pilat likens this to *P. sinuosa* as he says . . . " . . . praecipue poria parvioribus, regularioribus collorque in statu exsiccato minus isabelline vel subbrunescenti", it also has some resemblance to *P. lenis*, differing in the slightly larger hyphae, the larger pores, the more deeply colored pore surface in drying, and in the almost entire lack of curvature of the spores. In one collection the decay associated with the sporophore is of the brown cubical type.

30. PORIA SINUOSA (Fries) Sacc. Syll. Fung. **6**:322. 1888.

Annual, widely effused, at first with a narrow tomentose margin, tough and coriaceous when fresh, rigid on drying, separable but not easily so from a smooth substratum; subiculum white, sometimes distinct and 1 mm thick, sometimes scarcely evident; pore surface white when fresh, drying cinnamon-buff to pale bay, the tubes 1-2 mm long, their mouths typically very unequal and usually bluntly dentate and gaping, rarely more regular and angular, averaging 1 to 2 per mm; spores allantoid, smooth, hyaline, 3.5-5x1 μ; cystidia none or represented only by finger-like or lanceolate, paraphysis-like organs 2-4 μ diameter, especially likely to occur in non-sporulating portions of the hymenium; subiculum hyphae 2-4 μ diameter, simple or nearly so, the walls partially or entirely thickened, with neither septa nor clamps or with these present only on some finer hyphae about 2 μ diameter.

On dead wood of coniferous trees or rarely on hardwoods such as *Populus*. The species is not uncommon. The decay associated with the species is usually of the brown type.

The concept here presented is as I learned it from specimens communicated to me by Romell, by Egeland, and by Pilat, and from determinations of American material by Pilat. In this sense it is said not to be the same as *P. vaporaria* of Persoon, a name frequently applied to American collections, but perhaps synonymous with the Freisian *P. vaporaria*. Murrill says that *Poria incerta* Pers. is a synonym. *P. radula* seems not to be very different, although not in the sense of Bresadola and others who ascribe globose spores to that species.

31. PORIA SUBACIDA (Peck) Sacc. Syll. Fung. **6**:325. 1888.

Annual (perennial at times in the far West), often widely effused in sheets, but more frequently of less extent, measured in a few centimeters, separable or scarcely so on uneven surfaces, coriaceous-tough when fresh, with a light-colored, sterile, tomentose margin 5-6 mm broad that is reduced in mature specimens; subiculum thin, white, not conspicuous, becoming bay on the lower surface where peeled from the substratum and curling much on drying; pore surface white or light yellow when fresh, somewhat darker where bruised, whitish to yellowish or avellaneous in herbarium specimens; tubes 2-4 mm long, their mouths circular to somewhat angular, the walls thin and entire, averaging 3 to 3.5 per mm; spores ellipsoid or oblong-ellipsoid, smooth, hyaline, 4.5-6x2.5-4 μ; cystidia represented at times by small sterile organs either clavately thickened at the apex or inflated at the middle and with a bluntly pointed apex, 5-7 μ diameter; subiculum hyphae simple, with much thickened walls, neither septated nor clamped, 4-6 μ diameter; basidia 7-8 μ diameter.

On dead wood of both coniferous and deciduous trees, but especially on the former.

This is one of the most common species of the genus in the conifer regions of the state. It varies considerably and Peck described several varieties that do not seem worth maintaining. In the final stages the decayed wood is a soft, spongy, pale straw-colored mass, and the decay has been known as "feather rot" or "spongy root rot", the latter name being applied because the fungus produces a heart-rot of that character in living conifers. It is said to be the most important rot of balsam fir. In the early stages white pockets appear in the spring wood, but in the advanced stages these run together, until finally the wood becomes a spongy, water-soaked mass.

32. PORIA SUBINCARNATA (Peck) Murr. Mycologia **13**: 86. 1921.

Annual, effused for several centimeters, adnate or on a smooth surface separable, coriaceous when fresh, drying firm and hard, the margin thin, white, and eventually disappearing; subiculum white, very thin and indistinct; pore surface white when fresh, often drying yellowish or at times inclined to pale bay or again slightly flesh-colored, often cracking on drying; tubes up to 1 mm long but often only 0.25 mm, the mouths angular, thin-walled, entire, averaging 5 to 7 per mm or frequently elongated and somewhat gaping; spores allantoid, somewhat curved, hyaline, 3-5x1 μ; cystidia none or represented by small pointed organs 3-5 μ diameter in the hymenium; hyphae sparingly branched or simple, with walls partially thickened, no septa and no clamps, 2-4 μ diameter; hyphal pegs present in the pores.

On dead decorticated wood of both coniferous and deciduous trees. The species is rather common in Pennsylvania and throughout the northern states and Canada. *P. biguttata* Romell is a synonym. The species is one of those that have been referred to *P. vulgaris*. Romell indicated the synonymy of his species, but the name *P. vulgaris* has varied so much in its application that it seems best to use the American name. As here defined the species differs in a number of characteristics from *P. lenis*, and these are pointed out under that species.

In some of my collections the associated decay is of the brown type, in others this is not so definite.

33. PORIA SUBRUFA Ell. and Dearn. Proc. Canad. Inst. 1 (n. ser.) pt. **3**: 89. 1897.

Annual, widely effused, soft when fresh, collapsing and friable when dry, separable, with a narrow pubescent margin when young; subiculum thin, pallid, somewhat resinous on drying; pore surface at first white, in age becoming pinkish rufescent and when wounded changing to the same color, in the main drying to a sordid or pale dirty brown color; tubes 1-5 mm long, collapsing and sometimes subresinous on drying, their mouths becoming angular, thin-walled, entire or nearly so, friable on drying, averaging 3 to 4 per mm; spores ellipsoid, smooth, hyaline, 4-5x2-3 μ; cystidia none; subiculum hyphae thick-walled, somewhat branched, septated and clamped, 3-5 μ diameter; tissue not permanently darkened in KOH.

On dead and rotten wood of deciduous and coniferous trees. Not a common species.

The above description is to some extent incomplete. Apparently, as to colors, it is the same type of plant as *Polyporus fragilis*, white

when fresh, assuming rufescent tints on drying, but sordid-rufescent when thoroughly dried.

34. PORIA TENUIS (Schw.) Cooke, Grevillea **14**: 114. 1886.

Annual or sometimes perennial, 1-15 mm thick, usually broadly effused for several centimeters, tough or coriaceous when fresh, drying firm but not hard and not brittle, not cracking, separable but not easily so, with a thin, narrow, soft-tomentose, pallid or yellowish, usually broadly sterile margin; subiculum very thin, pallid or whitish; pore surface gray to isabelline or pale avellaneous when fresh, sometimes somewhat fuscous or cinnamon on drying; tubes 0.5-3 mm long each season, attaining total lengths of 10 mm at times, indefinitely or not at all stratified, the older layers becoming white-stuffed, the mouths rather thick-walled, subcircular to subangular, entire, averaging 4 to 5 per mm; spores ellipsoid, oblong-ellipsoid, or broadly ellipsoid, often truncated slightly at one end, smooth, hyaline, thin-walled and often collapsed, 4.5-6.5x3.5-4.5 μ; cystidia none or represented by a few sharp-pointed, paraphysis-like organs; subiculum hyphae simple to considerably branched, the walls partially or completely thickened, neither septated nor clamped, 2-5 μ diameter.

On dead wood of deciduous trees. Common in Pennsylvania. The species differs from *P. unita* in degree rather than in quality. Specimens are a bit softer, the surface is not cracked in drying, the sporophore is more separable, the pores are a bit larger, and the hyphae of the subiculum are more flexuous, less branched, and of larger diameter. Gradations, however, occur, and some would reduce the species to synonymy while others would give it varietal rank. A white rot is associated with this species.

35. PORIA UNITA (Pers.) Cooke, Grevillea **14**: 109. 1886.

Thin and annual, 1-3 mm thick, or more often perennial and as much as 1 cm thick, often broadly effused for many centimeters, firm and dry, becoming hard and brittle in the herbarium, inseparable or separating only with difficulty, at first with a thin, narrow, compactly tomentose, white to cream-buff margin but eventually fertile to the margin; subiculum white or whitish, extremely thin and practically disappearing; pore surface gray to isabelline rather than pure white, often cracked on drying; tubes 0.5-3 mm long each season, finally very indistinctly stratified in 2 or more layers, the older layers becoming white-stuffed, the mouths at first circular and thick-walled, finally angular and thinner-walled, even and entire, averaging 5 to 7 per mm; spores ellipsoid to oblong-ellipsoid or broadly ellipsoid, slightly truncated at one

end, thin-walled and often collapsing, always abundant, 4-6x5-6 μ; basidia pyriform or ovoid, 6-8 μ diameter; cystidia none; subiculum hyphae typically rigid-appearing, much branched, neither septated nor clamped, not staining, thick-walled, 1.5-2.5 μ diameter.

On dead wood of deciduous trees; rarely on conifers; rather common on hardwood structural timbers. The species is common throughout the United States and Canada.

The species is characterized by the hard consistency, the perennial habit, the very fine pores, the narrow, rigid, and branched hyphae, and the thin-walled spores. I have kept distinct from this species specimens which depart from those characters. *P. pulchella* and *P. tenuis* can be recognized, though it would be just as logical to treat them as varieties of this species. *P. pulchella* is of bright yellow color on the pore surface and otherwise has the characters of *P. tenuis* rather than *P. unita*. *P. tenuis* is of less firm consistency, seems to be less xerophytic and hence less likely to occur on structural timbers, does not crack on drying, and the hyphae are larger and less rigid. *P. unita* is the most pronouncedly xerophytic species of the genus, often growing on old dry fence posts and fence rails and on some of our hardest timbers such as *Robinia*, piled in exposed situations. The rot produced by this species is not characteristic, but apparently is of the white type. The species is of considerable importance in the decay of structural timbers. It often occurs on beams and studding in out-buildings. Specimens on coniferous wood have some resemblance to *P. crassa* but can be distinguished by the thin-walled and slightly truncated spores and by the small hyphae without clamps in the subiculum.

This species has long been known to the mycological world as *P. medulla-panis*. This name (as *Boletus*) was given by Jacquin but recent authors agree that the species to which he gave that name cannot be identified. The name was taken up by both Fries and Persoon with different interpretations, that of Persoon being the interpretation usually given the species, but antedated by Fries' interpretation, hence that name is not valid for our plant although used by Bourdot and Galzin. Donk takes up the name *P. unita* for the species and has been followed in America by Baxter. Its American synonymy includes *P. alabamae* Berk. and Curt., and *P. amoema* Berk.

36. PORIA VAILLANTII (Fries) Cooke, Grevillea **14**: 111. 1886.

Annual, effused in small patches, easily separating, softly membranaceous and rather tender when fresh, usually with well de-

veloped and numerous, conspicuous, white mycelial cords, the margin long remaining broadly sterile and white; subiculum soft but tough, white, quite thin; pore surface white when fresh, often yellowish on drying, the tubes usually less than 1 mm long, rarely 2-3 mm, their mouths subcircular to definitely angular, thin-walled, entire to somewhat dentate, 2 to 3 per mm; spores ellipsoid, or oblong-ellipsoid, smooth, hyaline, 5-7x3-3.5 μ; cystidia none; subiculum hyphae sparingly branched, thin-walled, with occasional septa and clamps, 2-4 μ diameter.

On wood of coniferous trees; usually on boards and other forms of structural timber in damp situations. The species is common in the United States. It is a frequent fungus in greenhouses on the lower side of wooden flats or even on flower pots, but occurs as well on structural timbers in basements or under porches, and only occasionally in the forest. Sometimes it is definitely associated with a brown rot but at other times this is not so evident.

37. PORIA VERSIPORA (Pers.) Romell, Svensk Bot. Tidsk. **20**: 19. 1926.

Annual, effused in large or small patches on bark or wood, soft-coriaceous when fresh, rigid on drying, usually fertile to the margin but young specimens with narrow, pallid, farinose margins, often much cracked in drying, inseparable; subiculum thin, white, inconspicuous; pore surface rather uneven and rough, white when fresh and young, straw-colored at maturity and somewhat yellowish to ochraceous or pale bay in the herbarium; tubes 1 mm or less long, their mouths subcircular to angular or at times quite irregular or daedaloid, the walls usually uneven, sometimes somewhat irpiciform, rather thick to fairly thin, averaging 3 to 4 per mm when at all regular; spores ellipsoid to oblong-ellipsoid or rather broadly ellipsoid, smooth, hyaline, 4.5-6x2.5-3.5 μ; cystidia none; subiculum hyphae usually more or less incrusted, somewhat branched, with occasional septa and clamps that are quite small and inconspicuous, thin-walled or with walls only slightly thickened, 2-4.5 μ diameter, some branches in the subhymenium ending in bulb-like, terminal swellings 7-8 μ diameter.

On dead wood of deciduous trees or rarely on coniferous wood. In the hardwood areas of the state this is undoubtedly our most common *Poria* and can be picked up in almost every woodlot, on dead *Quercus alba* branches on the ground. The usually daedaloid, pale ochraceous pore surface, the *Quercus* habitat, and microscopically the unusually small clamps on unthickened hyphae, together with the oblong-ellipsoid spores is enough to identify most collections.

This species has passed under a variety of specific names. Bresadola first determined it for me as *P. mucida*. It has passed as *P. radula, P. sinuosa, P. vaporaria,* and perhaps others. Murrill, probably because of the confusion associated with these European names called it *P. ochracea*. *P. versipora* produces a white rot.

38. PORIA ZAMERIENSIS (Pilat) n. comb.

Annual, effused for several centimeters, rather soft or somewhat ceraceous when fresh, drying hard, inseparable, often with a conspicuous, white, fimbriate, sterile margin; subiculum distinct, as much as 1 mm thick, separated from the tube layer by a narrow, dark, resinous line in dried specimens; pore surface white when fresh, drying pale cinnamon or with a slight yellowish tint; tubes 2-4 mm long, their mouths finally angular or subangular, entire, thin-walled, very minute, averaging 6 to 7 per mm; spores allantoid, smooth, hyaline, 3-4.5x1 μ; cystidia none; subiculum hyphae usually separating with difficulty in dried specimens, hyaline, occasionally branched, clamped and septated, 3-5 μ diameter, thin-walled.

On dead bark of deciduous trees, noted only on *Carya* and *Acer*. But three collections of this are known in Pennsylvania. The specimens were originally determined for me by Pilat. It has somewhat of the appearance of resupinate *Polyporus semipileatus*.

The collections available are all on the bark of thick-barked trees and there is no evidence as to the type of decay produced.

SECTION II. CHROMOPORIA

39. PORIA AURANTIACA (Rostk.) Sacc. Syll. Fung. **9**:191. 1891.

Annual, effused for several centimeters, soft-ceraceous when fresh, drying hard, brittle, and cartilaginous, separable, with a narrow, white, mycelial margin; subiculum white or pallid, sometimes as much as 2-4 mm thick, drying hard; pore surface at first white, quickly discolored reddish where bruised and drying sordid brownish or darker but with a rufescent tint; tubes 1-3 mm long, their mouths thin-walled, irregular and somewhat sinuous, averaging 3 to 4 per mm; spores cylindric, smooth, hyaline, 5-7x2-3 μ; cystidia none; subiculum hyphae thin-walled, hyaline, neither septated nor clamped, 3-4.5 μ diameter.

On dead and rotten wood of coniferous trees. Not common in Pennsylvania. The name applied here is open to question. European writers speak of violet, rose, and orange colors, but I have seen but a single collection in the fresh condition and its colors were much less spectacular. The microscopic details are in better

agreement, and the spores are different from similarily colored species.

40. PORIA AUREA Peck, Ann. Rep. N. Y. State Mus. **43**: 21. 1890

Annual, effused up to lengths of 10 cm or more, separable when fresh (fide Peck), apparently soft and watery when fresh, with a greenish-yellow, fimbriate, byssoid margin (fide Peck) when young; subiculum thin and subgelatinous in fresh specimens (fide Peck), inconspicuous when dry; pore surface golden yellow (fide Peck) in fresh condition, between cartridge-buff and honey-yellow in the herbarium; tubes 2-5 mm long, their mouths angular, thin-walled, entire, collapsing on drying, averaging 2.5 to 5 per mm; spores oblong or short-cylindric, smooth, hyaline, 5.5-7.5x2.5-3.5 μ; cystidia rather abundant, conspicuous, conic-ventricose, 30-50x12-20 μ, some with a slight incrustation at the apex; subiculum hyphae hyaline, branched, thin-walled, 2-3 μ diameter, septated and clamped.

On dead wood of both deciduous and coniferous trees. Two collections only are known to me; the types at Albany and a collection by Atkinson at Ithaca. The former is on *Acer* and the latter is said to be on a coniferous substratum. The latter shows the fungus to have been associated with a brown type of decay.

The affinities of the species are not clear. Though Peck's description indicates it is a member of the Chromoporiae, the evidence of the specimen contradicts this to some extent. It has the appearance of a soft, white *Poria* that at maturity became yellowed. The appearance of the specimen now is much that of a thin watery *Poria subacida*, from which it differs, as it does from all other known species, in the well developed, mainly unincrusted cystidia. These are undoubtedly the diagnostic characters of the species. It is strange that the species has not been rediscovered in recent years. It is not known in Pennsylvania and attention is called to it here, partly in the hope that it may be rediscovered and partly because the dimensions of the characteristic cystidia were omitted from a previous paper by me. The rot characters are unknown.

41. PORIA CRUSTULINA Bres. Mycologia **17**: 75. 1925

Annual, broadly effused for several centimeters, separating but not easily, as a tough membrane, the margin thin, fimbriate, white; subiculum white, thin but rather distinct; pore surface at first whitish then becoming at times sulphur-yellow, on drying becoming uniformly pale bay or brighter and close to ochraceous orange or a pale Mars-yellow; tubes 1-2 mm long, their mouths angular, thin-walled, entire, averaging 3 to 4 per mm; spores short-cylin-

dric or oblong-cylindric, slightly curved, hyaline, 5-7x3-4 μ; cystidia none; subiculum hyphae unbranched, the walls considerably or completely thickened, with neither septa nor clamps, or on the smaller hyphae with scattered septa and clamps, 4-6 μ diameter, some of them finely incrusted.

On the bark of old logs of coniferous trees. The species is now known from New Hampshire and New York to Colorado and British Columbia and certainly may be expected in Pennsylvania, though no collections have yet been made. For many years I thought this might be *P. flavicans* but Romell would not pass it as such and later Pilat assured me it was not that species. The species is likely to be confused with *P. subacida* but the spores are very different. *P. aneirina* is similar but has shorter spores, thin-walled and clamped hyphae, and seems to be confined to *Populus*. Again with this species there arises the question as to whether it belongs with the white species or the bright colored ones. On the basis of some notes on the fresh specimens I am placing it in the latter group. *P. chromatica* Overh. is a synonym. *P. crustulina* produces a white rot.

42. PORIA EUPORA (Karst.) Cooke, Grevillea **14**:110. 1886.

Annual, effused for several centimeters on wood and bark, separable, more or less surrounded by a narrow, thin, white, slightly pubescent border not more than 1 mm broad, tough; subiculum thin but conspicuous, light-colored; pore surface pinkish ochre to light buff, light pinkish cinnamon, or light ochraceous salmon when fresh, not much changed in drying though sometimes inclined to cinnamon, usually glistening; tubes less than 0.5 mm long, their mouths more or less angular, thin-walled but quite regular and entire, averaging 5 to 6 per mm; spores ellipsoid or slightly elliptic, smooth, hyaline, 3-4x2-3 μ; cystidia abundant, cylindric, sometimes mostly imbedded but more often conspicuously and obliquely projecting, hyaline, heavily incrusted, 60-80x7.5-10 μ; subiculum hyphae hyaline, thin-walled, nearly simple, 2-4 μ diameter, neither septated nor clamped.

On dead wood and bark of deciduous trees; very rarely on conifers. A single collection is from a coniferous substratum. The species is very common in Pennsylvania and the eastern United States. The pinkish pore surface, the minute pores, the small spores, and the abundant incrusted cystidia make this species easily recognizable. *P. attenuata* Peck is a synonym. *P. eupora* produces a white rot.

43. PORIA GILVESCENS Bres. Ann. Myc. **6**: 40. 1908.

Annual, broadly effused, separable as a thin, tough membrane when fresh or revived, at first with a white, fimbriate margin that disappears more or less completely as the sporophore matures; subiculum very thin and membranaceous, white; pore surface at first white or slightly colored with tints of salmon-buff or light ochraceous salmon, drying pale avellaneous or light buff, hence distinctly cinereous or isabelline; tubes 0.5-3 mm long, their mouths subcircular to angular, thin-walled, entire, averaging 4 to 5 per mm; spores allantoid, smooth, hyaline, 3.5-7x2-2.5 μ, sometimes oblong or inconspicuously curved; cystidia none; subiculum hyphae with completely thickened walls, sparingly branched, neither septated nor clamped, 2.5-4 μ diameter.

On dead wood of deciduous trees. A rather uncommon but widely distributed species. Very likely this is either *P. cinerascens* Schw. or *P. cinera* (Schw.) Cooke, but since the types of neither are in existence those names must be forgotten. *P. Caryae* Schw. likewise is a synonym.

The species apparently is best placed in Chromoporia as indicated by the tints of more lively hue in fresh specimens. Dried specimens, showing only an isabelline or avellaneous coloration, would more logically be sought in the Leucoporia section.

While the sporophores of one Louisiana specimen on *Gleditsia* are definitely associated with a brown decay, a number of other collections are subtended by a white rot, undoubtedly due to this fungus.

44. PORIA INCRASSATA (Berk. and Curt.) Burt, Ann. Mo. Bot. Gard. **4**: 360. 1917.

Annual, usually rather widely effused, easily separating, tough and membranous, at first developed as a thick, felted pad of mycelium at the center of which pores begin formation, eventually becoming fertile to the margin, sometimes with well developed mycelial cords on the margin, soft and flexible when fresh, becoming brittle on drying, the margin at first white then cream-colored and remaining for a long time sterile; subiculum a distinct, white, mycelial mat; pore surface at first salmon-color or ochraceous in part, sometimes developing olivaceous shades and at maturity sooty brown or blackish; tubes up to 1 cm long, their mouths subcircular to angular, rather thick-walled, entire, averaging 1.5 to 3 per mm; spores ellipsoid to ovoid, smooth, 8-12x4.5-7 μ; cystidia none; subiculum hyphae thin-walled, with densely staining content, septated and with large, conspicuous clamps, 5-7 μ diameter, those of tramal region usually only 3-4.5 μ.

On dead wood of coniferous trees, especially on structural timbers. This is one of the most destructive decay fungi of structural timbers, though its ravages seem to be more or less confined to regions of higher humidity; hence it has been noted mainly in the South and on the Pacific Coast. It, more than *Merulius lacrymans* or *M. americanus,* seems to be most worthy of the name "Hausschwamm" or "house fungus" in this country. The decay produced is of the brown, carbonizing type, indistinguishable from that produced by *Merulius lacrymans* or its American counterpart. The sporophores, however, are easily distinguished.

Peck described this species under the name *P. pinea,* his material being from the forest—a rather unusual habitat for this species. The dark color of the spores, yet at the same time the failure of the tissue to darken with KOH, and the pale color of the subiculum make this species an anomaly in either of the colored sections of the genus.

45. PORIA LUTEO-FIMBRIATA Baxter, Papers Mich. Acad. Sci. **23**: 287. 1938.

Annual, effused for several centimeters, soft, tender, separable in fragments or leaving cottony traces on the substratum, the margin at first broadly sterile, finally fertile, often with prominent mycelial cords, maize-yellow or pale buff; subiculum pale buff, thin, fragile; pore surface maize-yellow to ochraceous buff, or orange, losing most of the brightness of its coloration on drying and scarcely more than ochraceous or with a buff tint; tubes elongate to 5 mm or more at the center, often merulioid toward the margin, the mouths usually lacerated, thin-walled and fragile when dry, averaging 1 to 2 per mm, often collapsed; spores oblong-ellipsoid, or ellipsoid to slightly reniform or short-cylindric, smooth, hyaline under microscope, 4.5-7x2.5-3.5 μ; subiculum hyphae thin-walled, densely staining, septated and clamped, mainly 3-4 μ diameter, with some 6-12 μ; KOH solution changes the tissues permanently blackish.

On rotten wood of coniferous trees; doubtful on hardwoods. *P. vitellina* Schw. may be the same thing, but it grew on a hardwood substratum and the types are in poor condition so that the reference is uncertain. The change of color on drying is so profound that such specimens are likely to be roughly classified as belonging to the white section of the genus. The rot seems to be of the brown type.

46. PORIA MUTANS Peck, Ann. Rept. N. Y. State Mus. **43**: 39. 1890.

Annual, effused for several centimeters, separable, with an abrupt and sterile, white or deep cream margin that eventually

becomes concolorous and fertile, rather cheesy when fresh, drying very hard and sometimes more or less waxy; subiculum distinct, rarely as much as 2 mm thick and usually much thinner; pore surface deep cream-color to buff or light orange-yellow when fresh, immediately red where bruised and becoming pinkish red, reddish black, or black with age and on drying; tubes 1-5 mm long, their mouths subangular, entire, thin-walled, averaging 3 to 4 per mm; spores ellipsoid or nearly globose, smooth, hyaline under microscope, 3.5-5x2.5-3.5 μ; cystidia none; subiculum hyphae hyaline, many encrusted with large crystals, sparingly branched, 2.5-4 μ diameter, septa and clamps infrequent but present; tissue cherry-red then blackish with KOH solution.

On dead wood of deciduous trees; perhaps occasionally on conifers. The species is similar to *P. spissa*. Both are of the same coloration when fresh, and both become red where bruised and on drying; *P. mutans* becomes much harder on drying and has very different spores. The species is common in Pennsylvania, often on *Castanea* and *Prunus serotina* logs.

Although the underlying wood is often strongly discolored by the mycelium and perhaps rotted by other fungi, a white decay is attributed to this species.

47. PORIA NIGRESCENS Bres. Atti Acad. Rovereto III. **3**: 83. 1897.

Perennial or at least persisting for as much as three or four years, effused in orbicular or elongated patches 3-9 cm long and wide and up to 1.5 cm thick, separable at least in age, with a narrow, adnate or loosening border, firm and sub-corky; subiculum distinct but scarcely 0.5 mm thick, white when fresh, more yellowish on drying; pore surface flesh-color or light vinaceous fawn when fresh, immediately darker when bruised, some specimens drying to cinnamon-drab or avellaneous, others to fuscous or smoky drab; tubes in old sporophores in distinct layers, 1-5 mm long each season, separated by thin layers of context, in drying sometimes partially loosening from each other, typically with the growth of each successive season not covering all of the pore surface of the previous year, the mouths subcircular to angular, rather thick-walled, entire, averaging 5 to 6 per mm; spores broadly ellipsoid to nearly globose, smooth, hyaline, 3-5 μ diameter; cystidia none; subiculum hyphae hyaline, mostly with greatly or completely thickened walls, septated but not clamped, 4.5-7.5 μ diameter; tissue changing to reddish where touched with KOH solution.

On rotting bark and wood of deciduous and coniferous trees. The flesh-colored tint of the fresh pore surface, usually darkening on

drying, the perennial habit with the receding growth and the well-defined tube layer of each year, the large diameter hyphae, and the color change with KOH are the distinctive features of this species. It is fairly common in Pennsylvania. It produces a white rot.

48. PORIA PULCHELLA (Schw.) Cooke, Grevillea **14**:113. 1886.

Annual or perhaps reviving for several seasons, usually broadly effused for several centimeters, coriaceous when fresh, drying rather hard, scarcely separable; the margin egg-yellow to pale sulphur-yellow, at first sterile and pubescent, later becoming fertile; subiculum thin, yellowish; pore surface cream-buff to Naples-yellow or antimony-yellow, retaining these colors or fading to straw-yellow in the herbarium; tubes 1-4 mm long, usually in a single layer, their mouths subcircular to subangular, rather thin-walled, entire, averaging 3 to 4 per mm; spores oblong-ellipsoid to broadly ellipsoid or subglobose, smooth, hyaline, thin-walled and often collapsed, 5-7x3-5 μ; basidia inflated, 7-9 μ diameter; cystidia none or occasionally represented by narrow, pointed, sterile organs between the basidia; subiculum hyphae nearly simple to considerably branched, thick-walled, neither septated nor clamped, 2-4 μ diameter.

On dead wood of deciduous trees. The species is rather common in Pennsylvania. Its chief claim to recognition as distinct from *P. unita* and *P. tenuis* as treated here is in its bright coloration, the somewhat larger pores and the more distinctly annual habit. Hyphal characters ally it closer to the former of these species. See further under *P. unita*. *P. xantholoma* Schw., *P. vitellinula* Karst., and *P. chrysella* Egeland are undoubtedly synonyms. The rot produced is of the white type.

49. PORIA PURPUREA (Fries) Cooke, Grevillea **14**:112. 1886.

Annual, effused in small patches or interruptedly effused over larger areas, the margin scarcely determinate in the thinner forms of the species, not separable, rather tender, ceraceous; subiculum extremely thin, practically invisible; pore surface ochraceous cinnamon when fresh, on drying becoming rather uniformly a pinkish red close to vinaceous cinnamon or as dark as vinaceous russet; tubes usually lying obliquely on the surface of the substratum, less than 0.5 mm long, the mouths elongated, gaping, averaging 3 to 5 per mm; spores cylindric, curved, hyaline, 5-7x1.5-2 μ; cystidia none; in vertical section sometimes showing a prominent though narrow substratal layer of open hyphae of large diameter, septated but not clamped, the walls thickened somewhat and more or less incrusted, in others no such large hyphae, 3-5 μ diameter,

otherwise as above; hyphae of trama smaller and more compact; tissue permanently blackish with KOH.

On much decayed logs of hardwood trees and conifers. The species is not common in Pennsylvania.

The species is noteworthy for the thinness of the fructification, the cylindric spores, the pinkish red, pale lilac, or rather dark red coloration assumed on drying, and especially for the narrow layer of open hyphae along the substratum, these of unusually large diameter, incrusted, septated but not clamped. In these characters it is amply distinct from both *P. mutans* and *P. spissa*. In some the tubes lie directly on the substratum in part, giving the appearance of reticulated lines. In others the pore surface is more poroid but in all cases the tubes are very oblique. *P. purpurea* produces a white rot.

50. PORIA RIXOSA Karst. in Myc. Univ. no. 1204. 1879.

Annual, widely effused, separable, the margin cream-colored to pale buff, fimbriate when young, coriaceous in texture, drying firm; subiculum thin, pallid; pore surface pinkish cinnamon to salmon-color or vinaceous pink when fresh, immediately dark red where wounded, slightly darker and fawn-color to somewhat avellaneous on drying; tubes 0.5-2 mm long, their mouths regularly angular, thin-walled, entire, averaging 4 to 6 per mm when on horizontal substrata, but often in more oblique situations and the mouths gaping and elongated, and then about 3 per mm; spores allantoid, hyaline, 3.5-4.5x1-1.5 μ; cystidia rather abundant, often grouped, heavily incrusted, cylindric or clavate, some projecting, others imbedded in the pore walls, 32-44x9-16 μ; subiculum hyphae simple or sparingly branched, 3-4.5 μ diameter, with a few scattered septa and clamps or at times these apparently lacking; tissue permanently darkening with KOH.

On dead wood of coniferous trees. This species is less abundant than *P. eupora*, is similar in coloration and other characters except for its occurrence on coniferous substrata, and in having larger cystidia. *P. Dodgei* Murr. is the same plant, with cystidia extremely rare. *P. rixosa* produces a white rot.

51. PORIA RUFA (Schrad. ex Fr.) Cooke, Grevillea **14**:110. 1886.

Annual, rather widely effused, soft-coriaceous or inclined to be waxy when fresh, separable, first appearing as a white mycelial mat that becomes darker as the pores form from the center toward the margin, sometimes obliterating the white margin entirely; subiculum definite, white, often as much as 1 mm thick, soft and spongy when fresh; pore surface more or less merulioid in appearance, at

first cinnamon or orange-cinnamon, gradually more reddish (cacao-brown), then becoming purplish black or almost black (Hay's brown to dark seal-brown); tubes at first merulioid, gradually elongating but never exceeding 0.5 mm long, the mouths entire, rather irregular but occasionally subangular at maturity, rather thick-walled, averaging 2 to 4 per mm; spores minute, allantoid, hyaline, 3.5-5x0.5-1 μ; cystidia none or represented at times by a few pointed colored bodies 3-4 μ diameter; subiculum hyphae septated but not clamped, with thickened walls, 4-6 μ diameter, those of the subhymenium finely incrusted; light-colored portions of the tissue becoming blackish with KOH.

On bark or rarely on wood of dead coniferous trees. The species is common in Pennsylvania. The purplish black or black coloration assumed by most sporophores on drying, contrasted with the conspicuous white margin and white subiculum is usually enough to identify this species. Even the specimens with dark red pore surfaces are just as characteristic. I do not believe that any distinction can be made between this species and *Merulius Ravenelii* as maintained by Burt. The pore surface is typically merulioid and the species perhaps properly belongs in that genus. The species is often known as *P. taxicola* (Pers.) Bres. *P. rufa* produces a white rot.

52. PORIA SEMITINCTA (Peck) Cooke, Grevillea **14**:115. 1886.

Annual, resupinate over rather large areas, tough, membranaceous, with a white or more typically lilac, tomentose, sterile margin, with a few white, rhizomorphic strands; subiculum very thin, white or distinctly lilac or lavender in fresh specimens; pore surface when young and fresh showing a delicate lilac or lavender tint, especially towards the margins, later becoming white to pale cream-colored when fresh, drying pinkish cinnamon to isabelline or rarely with a vinaceous shade; tubes less than 0.5 mm long, their mouths merulioid, subcircular, the walls thin, entire, averaging 3 to 4 per mm; spores short-cylindric, hyaline, 3-4x1-2 μ; cystidia none or at least inconspicuous and represented by projecting incrusted hyphae, 6-9 μ diameter; subiculum hyphae hyaline, branched, thin-walled, prominently septated but not clamped, 4-7 μ diameter, sometimes incrusted; no color change in KOH.

On dead wood of deciduous or rarely coniferous trees. A common species in Pennsylvania, especially on *Quercus alba*. The diagnostic features of the species lie in the characteristic lilac coloration of fresh specimens, the small spores, the merulioid appearance of the pore surface, and the hyphae of rather large size with conspicuous and abundant septa but no clamps. The species

is in reality better placed in the genus *Merulius*, since the hymenium is continuous over the folds. It produces a white rot.

53. PORIA SPISSA (Schw.) Cooke, Grevillea **14**: 110. 1886.

Annual, widely effused for 10-12 cm or more, separable but not easily so, often with a sweet, acid odor when fresh, rather soft and waxy when fresh, drying hard and brittle, with a light yellow to warm buff or ochraceous buff sterile margin; subiculum thin but conspicuous in dried specimens, light-colored; pore surface ochraceous buff to orange-buff or ochraceous orange when fresh, immediately dark red or blood-red where wounded, changing to orange-cinnamon, hazel or bone-brown on drying; tubes 0.5-2 mm long when fresh, shrinking on drying, the mouths subcircular, rather thick-walled, entire, 4 to 6 per mm in fresh condition but in dried specimens often collapsed and invisible; spores allantoid, hyaline, 3.5-5x1-2 μ; cystidia none; subiculum hyphae branched, thin-walled, septated but not clamped, usually incrusted, 2-4 μ diameter; tissue blackish with KOH.

On dead wood of both coniferous and deciduous trees. This is a common species in Pennsylvania. The color assumed by the dried specimens depends on the relative stage of maturity when collected. Young specimens discolor less than older ones, but they never reach the purple-black coloration of *P. rufa*. *P. laetifica* Peck is a synonym.

The evidence as to the type of decay produced is so contradictory that no definite statement can be made, but in more cases than otherwise it would seem to be a nondescript white rot. Usually the substratum is well rotted.

54. PORIA UNDATA (Pers.) Bres. Ann Myc. **1**: 78. 1903.

Annual, effused for many centimeters at times, often covering large areas on the under surfaces of logs, separable in large tough sheets, typically fertile to the margin, often loosening from the substratum, curling strongly on drying; subiculum definite, sometimes nearly 1 mm thick but often thinner, whitish when fresh, drying pale bay next the substratum, somewhat cartilaginous on drying; pore surface whitish, with a faint flesh-color tinge, hardly changing where bruised but becoming darker or at times suffused with a grayish pruinosity on drying, often definitely and strongly nodulose; tubes 1-4 mm long, their mouths at first circular and thick-walled, becoming angular and more thin-walled, even and entire, averaging 4 to 5 per mm; spores globose, smooth, hyaline, 4.5-6 μ diameter; subiculum hyphae rigid, with walls completely or very

greatly thickened, sparingly or not at all branched, 4-8 μ diameter, neither septated nor clamped; no color change in KOH.

On dead wood of deciduous trees; rarely on conifers. The species is rather rare in Pennsylvania, common southward. Some of my collections have been verified by Pilat. I see no essential difference between this and the resupinate condition of *Polyporus rigidus* as presented a number of times previously in my writings. The globose spores, large, thick-walled hyphae, slightly flesh-tinted pore surface, etc., are diagnostic characters. The rot produced is of the white pocket type, comparable to that of *Polyporus zonalis* and *P. rigidus*. Donk uses the name *P. vitrea* Fr. (non Pers.) for this species.

55. PORIA XANTHA (Fries ex Lind) Cooke,
Grevillea **14**: 112. 1886.

Annual or probably persisting for two or three seasons and attaining a total thickness of 2-10 mm, broadly effused often for several centimeters, separable but not continuously so, normally without sterile margin though sometimes showing remnants of one, cheesy in consistency when fresh, chalky when dry; subiculum, except in young specimens, relatively thick or appearing so, more or less chalky and friable, apparently formed by the stuffing of the older tubes so as to form a chalky substratal region in older specimens; pore surface typically uneven and frequently much cracked, pale lemon-yellow or pale sulphur-yellow in most cases but sometimes nearly white, typically unchanged on drying but sometimes becoming a pale bay; tubes 1-6 mm long, the mouths circular or in age subangular, the walls thick and entire, averaging 4 to 6 per mm; spores allantoid, hyaline, 3-4x1 μ; cystidia apparently none in some specimens but in others represented by pointed, narrow organs 2-4 μ diameter; hyphae of subiculum 1.5-2.5 μ diameter, with inconspicuous septa and clamps, considerably branched, often filled with oil globules; taste intensely bitter; tissue exuding a cloudy substance when transferred from alcohol to water in the softening process.

Usually on decorticated wood of coniferous trees; occasionally on *Prunus serotina;* sometimes on charred wood. The species is common in Pennsylvania. The pale yellow color, the chalky or cheesy consistency, the bitter taste, and the small hyphae are distinguishing characters. The identity of this species with the original conception of *P. xantha* (Fries) Lind is perhaps no longer open to criticism. As early as 1925 Romell wrote me that he had arrived at that conclusion after finding a specimen with thin pore walls that agreed in that character with a specimen in the Fries' Herbarium; other collections have thicker walls, and for that

reason he previously had thought the identity doubtful. Baxter has also examined more recently the type in Fries' herbarium and agrees that our specimens should be referred to that name. There seems no longer any logical reason for a preference for *P. selecta* Karst., under which name I have identified many specimens for correspondents over a long period of years. The rot produced is definitely of the brown carbonizing type.

SECTION III. FUSCOPORIA

56. PORIA ANDERSONI (Ell. and Ev.) Neuman, Wisc. Geol. Nat. Hist. Sur. Bull. **33**:57. 1914.

Annual, broadly effused, usually on nearly vertical surfaces so that the tubes are very oblique, separable, soft and pliable when fresh, with a light yellow mycelium penetrating the substratum; margin abrupt, yellowish; subiculum thin, soft and pliant, brown in mature specimens, often disappearing; pore surface sulphur-yellow at first becoming dark yellowish brown or rusty brown with age, the tubes 0.5-1 cm or more long, very oblique, their mouths often much elongated but sometimes only irregular and lacerated, rather thick-walled, averaging 3 to 4 per mm; spores ellipsoid or subglobose, golden yellow in KOH, yellowish green or sulphur-yellow in mass, smooth, 6-8x5-7 μ; setae present, sometimes rather abundant, sometimes quite rare, apparently occasionally absent, conic to fusoid and lanceolate, projecting but slightly beyond the basidia, 16-32x7-10 μ; a few imbedded setal hyphae occasionally seen in the walls of the tubes, up to 8 μ diameter; subiculum hyphae rather thin-walled, sometimes branched, with occasional septa but no clamps, 2.5-4 μ diameter.

On snags and logs of *Quercus* and *Carya;* occasionally on other substrata. Not common in Pennsylvania but more abundant south and west. This species has the habit of growth of *P. obliqua,* developing under the outer layers of wood and finally throwing off these tissues and becoming exposed, at maturity dusting the surroundings with the yellowish spores. It is clearly distinct from that species in usually inhabiting a different set of hosts, in never being associated with the sterile cinder-like and abortive conchs of that species, and in having smaller and very distinctly colored spores. In culture, Campbell and Davidson have shown the two to be abundantly distinct. *Polyporus glomeratus* is distinct in manner of growth, being superficial in position from the first; it usually develops something of a pileus; the substratum is nearly always some species of maple (usually *Acer rubrum*) ; the tissue has abundant setal hyphae through the subiculum and trama, these measur-

ing 7-16 μ diameter; and it has somewhat smaller spores, 4.5-6x 3.5-4 μ. *Poria Leeii* (Murr.) Sacc. and Trott is a synonym, as is also *P. xanthospora* Underw. *P. Andersoni* was at one time made the type of a new genus *Xanthoporia* Murr.

The presence of setae and setal hyphae is a variable character. In some specimens I have been unable to find either; in others setae are present in the hymenium, arising from the ordinary tramal hyphae, and sometimes from the projecting setal hyphae. As in other species where attempts are made to locate setal hyphae, the mounts should be made in lactic acid rather than in KOH, since the former reagent does not darken the tissue.

P. Andersoni produces a white rot. Campbell and Davidson report it as causing important top and trunk rot of living oaks in the South and Middlewest. It fruits on the dead tops of living trees or on dead snags.

57. PORIA FERREA (Pers.) Bourd. and Galzin, Bull. Soc. Myc. Fr. **41**:247. 1925.

Perennial for a maximum of four or five years, effused, sometimes in elliptic patches 3-7 cm. wide, sometimes larger, in age loosening from the substratum to some extent, rather firm and leathery, typically with a sterile, cinnamon-colored, fibrillose-tomentose margin; subiculum thin though fairly conspicuous in young specimens and then about 0.5 mm thick, eventually indistinct; pore surface cinnamon-brown to dark brown or sometimes rusty brown, weathering to grayish with age; tubes 1-3 mm long each season, reaching a total length of 6-8 mm, whitish within, their mouths subcircular to somewhat angular, thick-walled, entire, averaging 4 to 5 per mm; spores cylindric, hyaline, 5-7x2-2.5 μ; basidia 5-7 μ diameter, inflated somewhat; setae rather abundant, projecting 10-20 μ beyond the basidia, gradually attenuated to a narrow, sharp tip, narrowly conic, 5-10 μ diameter at the slightly enlarged base, 30-40 μ long; imbedded setal hyphae none; subiculum hyphae simple, reddish brown in KOH, neither septated nor clamped, 2-3 μ diameter.

On dead wood of deciduous trees, especially *Alnus*. On small branches this species has the habit of *P. inermis*, forming elongated sporophores that become quite thick for their width which is limited by the narrowness of the branch or trunk inhabited. The margin often recedes with age, the pore surface becoming smaller each year. The species is common in Pennsylvania. *P. fulvida* Ell. and Ev. is a synonym. It is most likely to be confused with *P. ferruginosa*, the best separating character being the spores. *P. ferrea* produces a white rot.

58. PORIA FERRUGINEO-FUSCA Karst. Meddel. Faun. Fl. Fenn. **14**: 82. 1887.

Annual or rarely perennial, effused for several centimeters, with a narrow, thin, sterile, tomentose border of light color in fresh specimens, coriaceous-corky, inseparable; subiculum conspicuous, bright tawny, up to 1 mm thick; pore surface snuff-brown or cinnamon-brown, or with a grayish cast, unchanged on drying; tubes 2-4 mm long, their mouths circular, rather thick-walled, entire, averaging 4 to 5 per mm; spores allantoid, hyaline, 3-5x1-2 μ; setae abundant, not conspicuous, bluntly pointed, 3-5 μ diameter, cylindric or very narrowly conic, projecting only 10-20 μ beyond the basidia; hyphae chestnut-brown in KOH, with walls partially thickened, septated but not clamped, 3 μ diameter; setal hyphae abundant and making up the major portion of the subiculum and pore walls, 6-12 μ diameter, darker in color than the smaller subiculum and tramal hyphae, terminating in the hymenium in the setal tips which therefore are of rather indefinite length, and not much enlarged.

On dead wood of coniferous trees. The setal hyphae are likely to be overlooked unless traced to their setal tips, since they make up the major portion of the tissue and are likely to be considered as the tramal or subiculum hyphae. *P. marginella* Peck is a synonym. The species is not known to occur in Pennsylvania but has been collected in adjacent New York.

The rot produced is of the white type, first appearing as pockets in the spring wood.

59. PORIA FERRUGINOSA (Schrad. ex Fries) Karst. Bidr. Finl. Nat. Folk. **37**: 82. 1882.

Annual or at times perennial, effused for several centimeters on wood or bark, inseparable, with a brown, tawny pubescent margin less than 1 mm broad, fertile at maturity, coriaceous; subiculum very thin, usually not more than 0.5 mm thick, fibrous, scarcely discernible in thin sporophores; pore surface cinnamon, sayal-brown, or snuff-brown, the tubes 1-2 mm long each season, not distinctly stratified in perennial specimens which may involve three or four year's growth, brown within or the older layers somewhat whitish-pubescent under a lens, the mouths subcircular to subangular, the walls at first thickened, finally rather thin, even and entire or in oblique situations torn and gaping, averaging 4 to 6 per mm; spores oblong-ellipsoid or oblong, hyaline, 4-5x2-3.5 μ; setae rather abundant, attenuated to a fairly sharp apex, typically projecting 15-30 μ beyond the basidia, narrowly conic, 20-50x5-8 μ;

subiculum hyphae brown, simple, neither septated nor clamped, 2-3 μ diameter; imbedded setal hyphae often present in the subiculum, never abundant.

On dead wood of deciduous and occasionally coniferous trees. This is probably our most common brown *Poria*. It differs from *P. isabellina* in the different spores and in the shorter setae. *Polyporus Macounii* Peck is a synonym. Donk has recently cast doubt on the validity of the name *P. ferruginosa* for this species, and has renamed it *Ochroporus confusus* Donk. *P. ferruginosa* produces a white rot.

60. PORIA INERMIS Ell. and Ev. Proc. Acad. Nat. Sci. Phila. 1894: 322. 1894.

Perennial or at least persisting for three or four years, effused for 6-30 cm in narrow elongated patches on small trunks or branches, inseparable, firm and corky, with a narrow, bright colored, yellow-brown, sterile border rarely more than 1 mm broad; subiculum extremely thin, inconspicuous, brown; pore surface yellow-brown to snuff-brown or cinnamon-brown, finally weathering to grayish brown, much cracked in mature specimens; tubes usually oblique (because of the vertical substratum), 1-3 mm long, not stratified though increasing in length for several successive years, at first subcircular and minutely pubescent, then somewhat angular and glabrous, averaging 4 to 5 per mm, the walls thin and entire; spores broadly ellipsoid and slightly flattened on one side, or nearly globose, chestnut-brown, smooth, 5-6x3-4 μ; cystidia and setae none; no imbedded setal hyphae; hyphae brown, mostly simple, septated only in the paler colored ones, not clamped, 2.5-3 μ diameter.

On dead branches and trunks of *Nemopanthus mucronata* and perhaps rarely on *Alnus* and *Ilex*. The species is common in Pennsylvania wherever its usual substratum occurs. The dark brown spores, the lack of setae, and the substratum are diagnostic characters. It produces a typical white rot.

61. PORIA ISABELLINA (Fries) n. comb. (Not *P. isabellina* (Pat. and Gaill.) Sacc. Syll. Fung. **9**: 192. 1891)

Annual or sometimes persistent, often broadly and irregularly effused but frequently in narrow, elongated patches, inseparable, at first with a very narrow, tawny pubescent or strigose pubescent margin that usually persists though becoming more cinnamon in color and more glabrate with age; subiculum very thin, bright rusty brown; pore surface tawny olive to ochraceous tawny at first, finally of a duller color close to snuff-brown or with a tinge

of buffy brown; tubes 1-3 mm long, unstratified though sometimes persistent for more than one season, gray within, their mouths angular to somewhat sinuous, rather thin-walled but nearly entire, at first distinctly velutinate, averaging 2 to 4 per mm; spores cylindric, hyaline, 6-7x2-2.5 μ; setae abundant, visible in the tube walls under a good lens, projecting 25-60 μ beyond the basidial layer, tapering to a long slender point, lanceolate rather than conic, somewhat enlarged at the base, 40-70x6-8 (-10) μ; hyphae brown, neither septated nor clamped, 2-3 μ diameter.

On bark and wood of deciduous and coniferous trees. This is a common and well-known species that has passed under a variety of names of which perhaps *Poria contigua* is the oldest. No agreement exists or has existed for the last 100 years as to the correct application of that name. Romell studied the types of that species and reported them sterile, and stated moreover that *P. contigua* of Fries is a different species. *Boletus superficialis* Schw. is this species, as also is *Trametes tenuis* Karst. Occasionally the species is pileate and has been known as *Fomes tenuis* Karst. *Trametes setosus* Weir and *T. gilvoides* Lloyd are American synonyms. It produces in the sapwood of its deciduous substrata a white rot, but is known as a typical white pocket rot in western conifers.

62. PORIA LAEVIGATA (Fries) Cooke, Grevillea **14**: 114. 1886.

Perennial, broadly effused for many centimeters at times, often becoming thick and crust-like, firm and almost woody, with a thickish, sterile margin that occasionally becomes tumid and swollen and sometimes definitely but narrowly reflexed, inseparable; subiculum thin and soon indistinguishable, brown; pore surface varying from gray brown to dark brown, often weathering to grayish with age, the tubes 1-3 mm long each season, rather indistinctly stratified after the first year and becoming white-incrusted in the older layers, usually attaining a total thickness of about 1 cm, sometimes thicker but often much thinner; the mouths subcircular then subangular, rather thin-walled, entire, averaging 6 to 8 per mm; spores broadly ellipsoid or subglobose, smooth, hyaline, 4-4.5x3-4 μ; basidia 3-4 μ diameter; setae rather numerous, several to each tube cross-section, sometimes more abundant and sometimes quite rare, narrowly conic, sharp-pointed, 15-25x4.5-8 μ, only the tips projecting from between the basidia; subiculum hyphae simple, brown, 2.5-4.5 μ diameter, the walls slightly thickened, neither clamped nor septated; setal hyphae lacking.

On dead wood of deciduous trees, especially *Betula*. This is a common species in Pennsylvania, often forming large slabs on

erect snags, on wounded areas in living trees, and on down logs of *Betula;* uncommon on other substrata. I have previously referred to this as *Fomes igniarius* var. *laevigatus* and it is included here as a *Poria* only because it is commonly met in the resupinate condition. Microscopically the spores are distinctly smaller than in *F. igniarius. Poria betulina* (Murr.) is a synonym, the original spore record being in error. *P. prunicola* is difficult to separate from this species except by its habitat. In general, *P. prunicola* is thinner, seldom if ever attaining the thickness of specimens on Betula. The spores seem to be identical in the two, though perhaps somewhat inclined to be more ellipsoid in *P. prunicola* and globose in *P. laevigata,* but spores are often not to be demonstrated. The setae in the former are typically smaller and narrowed just above the base to produce a very narrow apex, much more elongated than those in *P. laevigata,* where the narrowing is all in the upper third of the seta. Yet even this character seems to break down. Setae are never numerous in *P. prunicola,* cross sections showing never more than half a dozen per pore while in *P. laevigata* 20 or more per pore is not unusual. This, however, will always be governed to some extent by the thickness of the sections, and might well be misleading. Baxter has discussed these two species in relation to each other and says that in culture they are quite distinct.

Both *P. laevigata* and *P. prunicola* produce white rots. The former is often associated with cankers on living yellow birch in the Northeast (Campbell and Davidson, Jour. For. **39**:559-560. 1941).

63. PORIA NIGRA Berk. in Hooker's London Jour. Bot. **4**:304. 1845.

Perennial, effused in large patches 10-20 cm or more broad and becoming as much as 2.5 cm thick, corky to woody, inseparable very hard next the substratum where the tubes fuse with the indistinct subiculum; pore surface blackish brown or blackish, the tubes stratified in annual layers that are rather indistinct and 5-6 mm long each season, white within, their mouths subcircular, rather thin-walled, entire and very smooth, averaging 5 to 7 per mm; spores broadly ellipsoid, chestnut-brown, smooth, 7-8x5-6 μ; setae none; hyphae of growing margin simple, dark brown, neither septated nor clamped, 4-5 μ diameter, those of the trama slightly larger (-6 μ) and with somewhat roughened walls, all partially thickened; tissue darkening with KOH but the reaction apparently not so distinct as with other brown species.

On dead wood of *Quercus.* Not a common species in the state and mainly southward in its distribution. The species is easily recognized by the dark chocolate color throughout.

Spores were obtained both in sections and from crushed mounts, but always free-floating and since no basidia were ever observed, it was at first supposed that possibly they were foreign. Campbell tells me that the species fruits in culture and that the spores are as described above. They are the exact counterparts of those of *Polyporus hispidus*. Other collections examined were sterile.

Information from Campbell and Davidson indicates that it causes a brown rot. The rot associated with one specimen is distinctly of the brown carbonizing type.

64. PORIA OBLIQUA (Pers.) Bres. Atti Acad. Rovereto III. 3:51. 1897.

Annual, effused on more or less vertical surfaces, hence with tubes nearly vertical and very oblique to the substratum, rather soft when fresh, brittle when dry, no distinctive margin, the subiculum distinct, brown, soon crumbling; pore surface bright yellow-brown at first, soon rusty brown and becoming blackish brown with age, often with a grayish pruinosity if collected in good condition and dried, that renders the entire pore surface gray or almost white; tubes 1-2 cm long in their oblique positions, yellowish brown within, their mouths very oblique and elongated, rather thick-walled, entire, averaging 3 to 4 per mm; spores ovoid to broadly ellipsoid, smooth, nearly colorless to slightly smoky or brownish in KOH, smooth, 8-10x5-7 μ; basidia 8-10 μ diameter; setae rather numerous, sometimes abundant, sharp-pointed, conic and with bulbous bases, mostly with only the tips projecting beyond the basidial layer, 6-12 μ diameter; setal hyphae present but not always easy to demonstrate, most abundant near the mouths of the tubes; hyphae much agglutinated and separated only with difficulty, neither septated nor clamped, 3-4 μ diameter.

On dead wood of deciduous trees, especially on *Betula;* occasionally on *Fagus* and *Ostrya*. The fungus is rarely collected, but is common in the birch regions. The sporophores are quickly destroyed by insects and soon become scarcely recognizable. Clinker-like masses of sterile fungus material are produced commonly by the fungus on living *Betula* and occasionally on *Ostrya*.

Although *Poria obliqua* had been several times reported for America, these were, probably without exception, based on some brown *Poria* of the *P. ferruginosa* type growing in oblique situations. About 1930 it was noted by Miss Mounce at the Ottawa Laboratory that the sterile, cinder-like, abortive conchs prevalent in the birch regions and often erroneously referred to *"Fomes nigricans"*, *F. igniarius*, and perhaps other species, produced in

culture spores that were unlike any known species of *Fomes*. She communicated these results to me and shortly afterwards they were verified by Campbell, working in my laboratory. The further details of the finding of the fruiting stage of a fungus with identical characters as those obtained from culturing the sterile conchs, the culturing of this stage with the production of cultures identical with those obtained from the sterile conchs, and the similarity in the decays produced in the two cases, have been detailed by Campbell and Davidson (Mycologia **30**:553-560. 1938; ibid, **31**:161-168. 1939), with the conclusion that the sterile conchs represent an abortive fructification of the *Poria* developing on the same birch trees after death of the host. The writer's identification of this fungus as *Poria obliqua* was confirmed by specimens sent to Pilat and by European specimens received from Romell, from Buchwald, and from Pilat. The fungus seems at first glance to always fruit under the bark which it ruptures and throws off, but closer inspection of this discarded layer shows that it includes not only the bark but also several annual layers of wood as well. It is not meant to infer here that all sterile conchs developed on birch are of this species, but certainly most of them in the East are so associated.

P. Andersoni is somewhat similar but the spores are smaller and strongly colored under the microscope. *P. glomeratus* differs in being almost entirely confined to maple, nearly always produces some form of reflexed pileate margin, has more abundant setal hyphae, and the spores are somewhat narrower (6-10x4-6 μ).

Poria obliqua produces a white rot of *Betula* indistinguishable from that caused by *Fomes igniarius*.

65. PORIA PEREFFUSA (Murr.) Sacc. and Trott.
Syll. Fung. **21**:335. 1912.

Perennial for several to many years, rather broadly effused, inseparable, at first with a narrow, yellowish brown, rusty tomentose, sterile margin that may persist for many years but eventually disappears; subiculum typically 0.5-1 mm thick but thicker in places, brown, in old specimens underlaid or traversed by a narrow, black line, bright yellow-brown; pore surface dark brown or dark grayish brown, sometimes cracked in drying, the tubes 1-3 mm long each season, indistinctly or not at all stratified in old specimens, and attaining a total length of 5-15 mm, inconspicuously white-stuffed in the older layers, the mouths subangular or angular, rather thin-walled, entire, averaging 5 to 8 per mm; spores ellipsoid to subglobose, smooth, pale rusty (KOH) at maturity, 3.5-4.5x2.5-3.5 μ; basidia 5-6 μ diameter, the hymenial layer pale

rusty in sections; setae scattered, often in twos, never abundant, sharp-pointed at the apex, enlarged below, conic, 16-25x5-8 μ, the tips only projecting beyond the basidia; no setal hyphae; subiculum hyphae simple, occasionally septated, no clamps, 2-4 μ diameter.

On dead wood of deciduous trees. The species is rather distinct in the pale rusty spores of small size, and the small setae. The type collection is mostly sterile but on one occasion when I examined it I found spores as indicated. On another occasion I was unable to find spores.

The type of this species was from Ohio Pyle, Pa., on a *Quercus* log.

66. PORIA PRUNICOLA (Murr.) Sacc. and Trott.
Syll. Fung. **21**:331. 1912.

Perennial, first appearing in orbicular patches 1-3 cm diameter, finally rather widely effused, thin specimens with a tendency to loosen slightly at the margin, otherwise adnate, at first with a narrow, yellow-brown or rusty brown, tomentose margin that finally disappears; subiculum quite thin, inconspicuous, brown, finally largely disappearing; pore surface rusty brown to buffy brown, becoming somewhat grayish after long weathering; tubes 1-2 mm long each season, attaining a final thickness of about 1 cm but usually thinner, not whitened within except in the older layers, rather indistinctly stratified, their mouths subcircular, thick-walled, entire, averaging 4 to 6 per mm; spores broadly ellipsoid to subglobose, smooth, hyaline, 4-5x3-4 μ; basidia 4-6 μ diameter; setae present, rare, scarcely projecting beyond the basidia, sharp-pointed, almost cylindric, 15-20x4-5 μ; hyphae brownish red in KOH, simple, neither septated nor clamped, 3-4.5 μ diameter; no setal hyphae.

On dead wood of *Prunus*, particularly *P. serotina* and *P. pennsylvanica*. The species is common in Pennsylvania and in general in the East where its usual hosts occur. It is apparently distinct from *P. laevigata*, but without the knowledge of the substratum one is sometimes doubtful. In general, the small, narrow setae and the subglobose, hyaline spores on basidia not more than 4-5 μ diameter will separate it from most of the related ones, while the paucity of setae (many tube cross sections with none at all) and their narrow tips enables one to separate it from *P. laevigata*. See further under *P. laevigata*. It might also be confused with a resupinate condition of *Fomes fulvus* which inhabits species of *Prunus* of the plum group. *P. prunicola* produces a white rot.

67. PORIA PUNCTATA Fries, Hymen. Eur. 572. 1874.

Perennial, effused for several centimeters, never loosening from the substratum, sometimes cracked on drying, young specimens with a distinct, yellow-brown, tomentose margin that mostly disappears with age; subiculum a thin, brown, inconspicuous membrane that usually disappears with age; pore surface yellow-brown to buffy brown or Saccardo's umber; tube layers reaching a total thickness of 1.5 cm, the tubes 1-3 mm long each season, soon stuffed with a gray or rusty gray mycelium, the annual layers separated by distinct though extremely narrow layers of subiculum so that the region is distinctly stratified, the mouths circular to subcircular, thick-walled, entire, averaging 5 to 8 per mm; spores globose or subglobose, smooth, hyaline, 5-8 μ diameter; basidia much inflated, 7-10 μ diameter; setae none; no setal hyphae; subiculum hyphae brown, simple, neither septated nor clamped, 2-4 μ diameter.

On dead wood of deciduous trees. A common species in Pennsylvania and with a wide distribution in America. The early American mycologists usually referred this species to *Fomes salicinus* and to *Poria obliqua*. Bresadola says that in European specimens setae are occasionally present and in a specimen from Romell I have found a few setae. Never have I seen them in an American specimen. Otherwise the species is characterized by the plainly laminated tube region—a character possessed to the same extent by no other brown *Poria*. In the hymenial region one frequently finds attenuate, hyaline, projecting hyphae less than 2 μ in diameter, having slightly enlarged to bulbous inflated bases. They may not be characteristic.

Poria laminata (Murr.) Sacc. and Trott., *P. obliquiformis* (Murr.). Sacc. and Trott., and *P. Friesiana* Bres. are synonyms. The species can be separated from *P. laevigata* by the larger spores and the absence of setae. It causes a white rot.

68. PORIA SUBICULOSA (Peck) Cooke, Grevillea **14**:114. 1886.

Annual or reviving for two or three years, easily separable, effused for several centimeters, consisting at first of a soft brown subiculum on which pores are later developed; margin broad, sterile, felt-like, clay-color to ochraceous tawny; subiculum soft, brown, up to 2 mm thick; pore surface cinnamon or ochraceous tawny, the tubes 1-2 mm long, their mouths angular to irregular or slightly daedaloid, the walls thin, entire to denticulate, averaging 1 to 2.5 per mm; spores broadly ovoid to broadly ellipsoid, or subglobose, hyaline, 5-7x3-5 μ; cystidia none; hyphae simple or

sparingly branched, thin-walled, septated, brown in KOH, with numerous septa but no clamps, 2.5-5 μ diameter.

On decayed logs. No Pennsylvania collections have been made; in fact the species is a rare one. I have seen specimens only from New York and Michigan. The wood on which the fungus grows is so decayed that it has been impossible to say whether it is of the deciduous or the coniferous type. Baxter reports it inhabiting coniferous logs. Peck says that it may even be found growing over mosses and stones in sheltered places.

69. PORIA TSUGINA (Murr.) Sacc. and Trott.
Syll. Fung. **21**:332. 1912.

Perennial, either widely effused on old logs or in smaller patches at the junction of branch and trunk on dead standing trunks, adnate, with a rather broad, thin, sterile, rusty margin, which is finally fertile, thicker, and darker; subiculum a thin, brown membrane not more than 1 mm thick; pore surface dark golden brown or tawny to dark grayish brown, the tube layers reaching a thickness of at least 6 cm but often 1 cm or less, the tubes 4-8 mm long each season, rather distinctly stratified, typically golden brown where cut vertically, the mouths subcircular to angular, thick-walled, entire, averaging 5 to 7 per mm, sometimes somewhat larger; spores globose or subglobose, smooth, hyaline, 5-8 μ diameter; setae none; subiculum hyphae brown, simple, no septa nor clamps, 2.5-3.5 μ diameter; basidia 6-8 μ diameter.

On dead wood of coniferous trees; apparently confined to *Tsuga canadensis* in Pennsylvania. This is a rather frequent species in this state. The habitat, the stratified and golden yellow tube region of older specimens, the lack of setae, and the hyaline spores of unusually large size are enough to identify the species. I have regarded this as a variety of *Fomes robustus* in some of my earlier publications, but it is necessary here to treat it as a member of this genus. *Fomes Hartigii* of Europe may be the same thing. *Poria Tsugina* produces a white rot.